ELECTRICAL REVIEW

Vol. CXLVI 5th MAY 1950 No. 3780

Managing Editor: HUGH S. POCOCK, M.I.E.E. *Technical Editor:* W. O. FENWICK, M.I.E.E.
Industrial Editor: J. H. COSENS *Technical Consultant:* C. O. BRETTELLE, M.I.E.E.

IN THIS ISSUE

Expanding Exports	843
Power Transformer Design	845
S.E. Board's Purchasing Policy	847
Progress in Uganda	848
I.E.E. Wiring Regulations	849
B.E.A.M.A. Annual Meeting	850
Personal and Social	851
Correspondence	854
Views on the News	855
British Industries Fair—Guide to Electrical Exhibits	856
Electricity in Mines	902
Electrical Contracting. *By H. R. Taunton, A.M.I.E.E.*	903
Commerce and Industry	907
Parliamentary News	912
Financial Section	913
Next Week's Events	918
The Building Industry	920
Classified Advertisements	125
Index to Advertisers	152

EDITORIAL, ADVERTISING & PUBLISHING OFFICES: Dorset House, Stamford St., London, S.E.1. Telegraphic Address: "Elecrev, Sedist, London." Code: ABC. Telephone No.: Waterloo 3333 (60 lines). Entered as Second Class Matter at the New York, U.S.A., Post Office. Annual Subscription: Home and Overseas £3 6s. 0d.; U.S.A. and Canada $11.00. Cheques & P.Os. (on Chief Office, London) payable to ELECTRICAL REVIEW PUBLICATIONS LTD. and crossed "Lloyds Bank."

1950

BIF

Berry's

We shall be delighted to welcome our Trade friends to Stand C.507/406 on the main avenue. This new site, occupying twice the space of last year's stand, will help us to do justice to our greatly increased range of Magicoal Fires and Lighting Fittings.

C507/406
Castle Bromwich

AUTOMATIC TIME CONTROL

T.21.

For Domestic Loads

The Sangamo Switch is a boon in any home or building, saving time and trouble, conserving fuel and power, and adding to comfort and convenience. Its many uses include automatic switching of corridor, porch, or lodge gate lighting, control of electric cookers, wireless sets, immersion heaters, etc., at any predetermined time and whether the occupier is "in" or "out". The Sangamo Time Switch is inexpensive, easily fitted and designed for a life-time of accurate service.

Sangamo Time Switches can be supplied for fixed "on" and "off" operations (with a maximum of three "on" and three "off" levers) or with Solar dial as illustrated, for automatically switching on at sunset and of at sunrise or between 8.30 p.m. and 1 a.m.

SANGAMO *Time Switches*

Sangamo Weston Ltd. Enfield, Middlesex. Tel.: Enfield 3434 (6 lines) & 1242 (4 lines). Grams.: Sanwest, Enfield.
Depots at Glasgow, Newcastle-on-Tyne, Manchester and Wolverhampton.

ELECTRICAL REVIEW

Vol. CXLVI No. 3780 5TH MAY, 1950

THE OLDEST ELECTRICAL PAPER • ESTABLISHED 1872

Expanding Exports

NEW RECORDS AND GREATER ENDEAVOUR

BEFORE the war the United Kingdom was the largest exporter of electrical goods and machinery in the world, the total value in 1938 amounting to approximately £22 million. The extent of the progress that has been made since then can be judged by the fact that last year the corresponding figure was about £122 million. Even allowing for the higher prices obtained this increase of five and a half times in value represents more than twice the pre-war volume of export trade.

Furthermore, it must be remembered that these figures cover only specifically electrical apparatus. There are numerous other goods which though largely electrically operated are classified under different headings in the official statistics. Among these are such items as refrigeration apparatus, compressors, boiler house plant, mechanical handling equipment, fans, dairy machinery, food and drink preparation equipment, machine tools, mining machinery, pumps, metal- and wood-working plant, textile machinery, etc.

Third Largest Exporter

The electrical industry can now claim to contribute the third largest volume of United Kingdom exports. What is still more encouraging is that electrical exports continue to expand, the total of £118 million for March being the highest monthly figure ever recorded, but it is an unfortunate fact that only a comparatively small proportion of the trade is with dollar and other hard currency areas.

This does not mean to say that the industry is not doing all in its power to increase its business in the more difficult markets. On the contrary, there has been very considerable activity both on the part of individual firms and of B.E.A.M.A. and other organizations in investigating possibilities of further trade, especially in Canada.

Transatlantic Trade

As a consequence, though still comparatively insignificant in relation to total volume of trade, British goods are now entering Canada at double the rate of this time last year. What has been done in this direction will be reflected at the British Industries Fair next week in many types of goods which have been specially designed to conform to Canadian standards. Undeterred, too, by the somewhat discouraging results so far achieved, manufacturers also display many products designed with the United States in view.

Another feature of electrical export trade is the way in which shipments of electrical goods and apparatus, as distinct from electrical machinery, are being maintained. In their attempts to expand old and develop new markets British electrical manufacturers are still maintaining their high reputation for good quality and endeavouring to reduce delivery periods to below those of foreign competitors.

INCREASED BURDENS

The few alterations in taxation proposed by the Chancellor of the Exchequer are generally adverse to industry. Increase in the duty on petrol and fuel oils and the purchase tax on new commercial vehicles are already raising the price of road haulage. This, and a reduction in respect of the more expensive cars, were the only alterations of purchase tax announced by Sir Stafford Cripps. Apparently the appeals of E.D.A. and the manufacturers of domestic electrical appliances (particularly water heaters) have had no effect. We do not despair, however, for variations in existing purchase tax can be (and are) made by Treasury Order. Endeavours to secure a lightening of this burden must be continued.

NEW ELECTRICITY STOCK

On Wednesday the prospectus was published for the long-expected issue of £150 million of 3½ per cent British Electricity Stock at the price of £99 per cent. The proceeds are required to repay temporary borrowings amounting at 31st March last to over £65 million and to finance further capital developments. The prospectus referred to the rapid growth of the electricity supply system and mentioned that the present installed plant capacity was 13,784 MW. The new stock is redeemable at par not later than 15th November, 1979, but it may be redeemed at par by drawings or otherwise, at the Authority's option, on or at any time after 15th November, 1976, on three months' notice. Previous issues of British Electricity Stock have aggregated about £442 million.

ACCIDENTS IN MINES

The report of H.M. Electrical Inspector of Mines for 1948 again records the occurence of a number of accidents due to damaged, unscreened trailing cables and we agree with the Inspector that there is no valid excuse for continuing to retain in use any longer a type of cable which has been shown to be so dangerous. Every year the necessity of adopting screened cables and earth-leakage protection has been stressed and it is disheartening to note that this advice is often disregarded. Although the total number of electrical accidents is rising year by year, the use of electricity, particularly at the coal face, is expanding even more rapidly. In other words, the use of electricity in mines is becoming safer, but this does not mean that we should be satisfied that six deaths and 50 cases of injury should be ascribed annually to electric shock. There are still instances of careless and slipshod work, and electrical equipment seems to be misused to no small extent. If the accident rate is to be reduced, effective education and training in safety must be given, not only to the "new entry," the apprentices, but to the existing electrical staffs at collieries and all other workers who have to deal with electrical equipment.

B.E.A. AND MANUFACTURE

In its monthly journal (now rechristened *Electron*) the Electrical Trades Union deprecates the action of the British Electricity Authority in ordering water valves from Italy. It is contended that the Authority should exercise the manufacturing powers conferred on it by the Electricity Act, 1947. This is a facile suggestion which has little regard to realities. It would be fantastic for the B.E.A. to set up manufacturing facilities to meet what may be merely a temporary inability of British manufacturers to satisfy the demand. Even where the lack of equipment is likely to be chronic there are better means of dealing with the situation. The B.E.A. has realized this in encouraging C. A. Parsons & Co. to undertake the production of steam piping and by its acceptance of John Brown & Co. as contractors for the supply of boiler plant. As we said last week, there are indications that all sections of the industry are becoming able to meet future needs.

"ELECTRICAL WHO'S WHO"

The "Electrical Who's Who," containing brief biographies of prominent people in all branches of the industry, is now obtainable (price 12s. 6d., postage 6d.) from the *Electrical Review*, Dorset House, Stamford Street, S.E.1, and booksellers.

Power Transformer Design

New Winding to Withstand Surges Due to Lighting

At a meeting of the Supply Section of the Institution of Electrical Engineers in London last week a paper on power transformer design was presented by Messrs. A. T. Chadwick, J. M. Ferguson, D. H. Ryder and G. F. Stearn, all of the English Electric Co., Ltd., in which special reference is made to a new type of winding that has been developed to withstand surges due to lightning.

The authors first outline the general principles on which the voltage distribution in a transformer winding is dependent, the effects of different impulse voltage wave shapes on the distribution in core-type transformers being subsequently discussed.

Breakdown/time-lag curves for insulation across coils and between turns are quoted and from these and the distribution measurements it is shown that the impulse voltage which might result in an inter-turn breakdown is, in general, very much higher than that required to cause a breakdown across coils.

Improved Voltage Distribution

The problem of obtaining adequate insulation across coils to meet the impulse-voltage level required for transformers on the highest voltage systems is then emphasized and a new type of winding of relatively simple construction, developed to overcome this difficulty, is described. This interleaved winding presents no special problem in production and it is shown that it is possible to improve the voltage distribution as compared with a conventional winding so as to give an almost linear distribution.

The voltage distribution in a typical example is compared with the conventional core type winding previously discussed. The oscillograms of the voltages in this winding due to a chopped wave show that, unlike the conventional winding, the chopped wave does not give rise to more severe conditions than full-wave tests.

It is concluded that by better utilization of insulation it is possible to obtain a very much higher impulse level with the new winding than is possible with a conventional winding using the same amount of axial insulation.

DISCUSSION

Mr. E. T. Norris (Ferranti, Ltd.) opened the discussion by saying that the paper should be considered in relation to other methods of surge improvement of which a number had been developed. Stress control was inherent in all of them and the basic principle was to increase the capacitance between turns and coils, particularly near the line end of the winding. An obvious method was to connect separate condensers across coils of suitable size, but he was not aware that this had been done on large power transformers. A linear or uniform distribution of the surge voltage throughout the winding was attractive in theory. The practical ideal was not necessarily linear distribution but to find the most economic way of obtaining a desired surge strength. There were so many practical considerations that it was unlikely that the ideal theoretical method would be the right one. Some of the difficulties of interleaving might be serious in certain transformers. There were a number of methods of achieving the desired end, which would be used in different degrees and different ways by different makers. They would not only be used differently for different transformers, but in different proportions by different makers for the same transformer.

Mr. R. W. Flux (B.E.A.) said that from the user's point of view the position was summed up in the first and last paragraphs of the paper, where the authors said: "It is now becoming standard practice for power transformers to be designed and built to withstand a specified impulse level. . . . By the better utilization of insulation it is possible to obtain a very much higher impulse level with the

new type of winding." Mr. Chadwick had added in presenting the paper that great economy could be achieved in that way; if, therefore, a "price ring" had a better nature, he would like to appeal to it.

The conventional disc winding would probably continue to be used for 11 and 22 kV. At the other end of the scale, if voltages went on rising it might be better to adopt the concentric barrel winding, as used in testing transformers and in the U.S.A. in power transformers. It was the experience of the B.E.A. that any of the windings which it had behaved very well indeed, though the best of designs nowadays seemed to be subject to troubles due to circumstances outside the control of the design office. He did not know whether this was due to deterioration in workmanship or because 132 kV plant was no longer regarded as the most important job in the works and greater attention was given to higher voltage types. At any rate, defects seemed to occur at 132 kV which did not happen so often years ago.

Conflicting Considerations

Mr. H. L. Thomas (B.T.H. Co.) remarked that the optimum utilization of materials in a structure was an attractive ideal, but in a high-voltage power transformer it was seldom achieved, because there were so many conflicting considerations to be taken into account. The authors had produced a winding in which the means for improving the voltage distribution resulted in a better utilization of the inter-turn insulation, but they achieved a reduction of impulse voltages between sections largely at the expense of increased voltages between turns. It might be asked if the presence of radial stresses comparable in magnitude with the axial stresses would distort the dielectric field between the sections sufficiently to cause stress concentration, with consequent lower breakdown strength than with the normal arrangement of turns. Discussions over the last ten years showed general agreement that the final choice of method was largely one of economics, and from this point of view the use of electrostatic shields with more or less the conventional disc winding might have some advantages.

Mr. R. Davis (N.P.L.) suggested that the aim in the design of transformers was to try to ensure that under all conditions of voltage stressing the maximum stress was as nearly as possible equal to the average stress. The authors, he pointed out, had gone from one transformer in which the maximum stress was 50 per cent on 2 per cent of the winding to a condition in which the stress on 6½ per cent of the winding was only 10 per cent, which was remarkable.

Possibilities of Damage

Mr. J. B. Hansell (Metropolitan-Vickers) said that in the authors' method the inter-turn insulation used for withstanding the voltage across a section was the same as would be used in a normal transformer to withstand the voltage across one turn, and the voltage stress under 50 c/s conditions would be about 15 times that on an ordinary transformer. He agreed that the calculated inter-turn insulation in the conventional winding was excessive to guard against damage between two electrically adjacent turns, but there were other factors to take into account, such as the possibility of damage to the paper covering while winding, and the possibility that the inter-turn insulation might be damaged by short circuits. If the insulation were damaged, then with 15 times the voltage between turns which would be present in the conventional design it was much more likely that the transformer would fail. In the conventional design high voltages appeared between sections near the end of the winding, but that was allowed for. He had examined during the past twenty years the few large transformers which had been returned to the works and only in one case had the inter-turn or inter-section insulation broken down and that would not have occurred had the transformer in question been designed on modern lines.

Mr. H. C. Rippon (Parsons) said that the disposition of axial insulation for large transformer windings was becoming increasingly important with transformers for use on very high voltage lines, and the authors had shown convincingly that in conventional transformers the axial insulation was not utilized efficiently; but they had dealt with the problem from one aspect only, and not from the point of view of keeping down weight and dimensions.

They themselves had concentrated on reducing the distance between the high-voltage and low-voltage windings, and by using a multi-layer concentric winding they were able to reduce considerably this important dimension and produce a smaller transformer for a given performance while using the insulation efficiently.

Mr. E. Tobin (Hackbridge & Hewittic) suggested that if consideration was given to a transformer's duty it might be felt that the authors' method was not as good as it seemed at first sight. A transformer had to maintain normal voltage all its life and to deal with surges on occasions. It might be detrimental to reduce the insulation at the ends of a transformer. In service conditions, conventional types of transformer seemed able to withstand the surges that they were likely to experience, and had good insulation for their normal working conditions. If he had to choose between the two methods, he would prefer to have more insulation on the end coils, i.e., on the coils themselves, not necessarily on the turns.

Mr. H. M. Lacy (E.R.A.) prefaced a number of detailed criticisms of the paper by saying that it showed a very interesting and logical development in the long process of improving the surge strength of transformers.

Mr. D. McDonald (B.T.H.) assured Mr. Flux that concentric cylindrical layer windings had been developed and were now in production in this country for voltages above 220 kV.

Mr. J. E. L. Robinson (Ferranti) and Mr. R. M. Charley (E.E. Co.) also commented briefly on the paper.

Mr. J. M. Ferguson, replying to the discussion, dealt with a criticism made by several speakers of the two transformer windings selected for comparison, on the ground that more than one variable was involved, and said that when new techniques and materials became available they involved changes in the form or detailed construction of an article. The new type of winding had enabled them to do things which they were not able to do before.

S.E. Board's Purchasing Policy

Mr. Skinner's Statement

THE customary six-monthly meeting between officials of the South Eastern Electricity Board and manufacturers' representatives took place at Brighton on 27th April, Mr. W. R. T. Skinner, deputy chairman of the Board, presiding. In a brief review of the Board's commercial activities, Mr. Skinner said that progress had been made in forward planning, but these efforts would be futile if there were sudden unforeseen cuts in capital expenditure. These cuts were wrongly applied to services considered to be essential. They would result in the Board's inability to provide the necessary supplies to industry, agriculture and the home. Mr. Skinner also dealt at some length with the crippling effect of the purchase tax on water heaters.

Referring to the Board's endeavours to decentralize purchasing, the speaker said that there had been a further advance. In the six months from October, 1949, to March last, only 6.3 per cent of the Board's 51,000 orders had been placed by headquarters, although the proportion in terms of value was somewhat higher.

Answering questions, Mr. Skinner said that there was no good reason for restricting development of the water-heating load which could be the least embarrassing so far as peaks were concerned. The Board's ordering was decided on a competitive basis of price and delivery, rather than according to quotas based on pre-nationalization orders placed with manufacturers, subject to any overriding technical considerations.

Broadly, it was the Board's intention to spread its requirements over a fair field. It was prepared to forgo any advantages of a rigid standard to avoid narrowing its field of purchases. Time and experience would show whether there should be any alteration in the arrangements governing Sub-Area purchasing powers, but it was not unlikely that Sub-Area responsibilities would be increased.

Replying to a question by Mr. Neville (G.E.C.), Mr. C. F. Wells, chief commercial officer, said that the Burford testing station had been reorganized to serve the Area, and it was able to conduct tests more rapidly. Mr. Skinner agreed with Mr. Macdonald (Ferguson, Pailin, Ltd.) that the sending of drawings to District offices where this could be done instead of to Area headquarters would save delay.

Nearly 200 people were present at the meeting.

PROGRESS IN UGANDA

Board's Second Annual Report

WITH commendable promptness the Uganda Electricity Board has issued its second annual report, a copy of which we have received from Sir John Kennedy, London member of the Board, of which Mr. C. R. Westlake is chairman. The report, a well-illustrated document printed in this country, includes also the accounts for the year to 31st December last. The period was the first full year of operation for although the Board was appointed at the beginning of January, 1948, it did not acquire the Uganda assets of the East African Power and Lighting Co. until 31st May of that year.

At the end of 1949 the Board's net loan debt outstanding was £1,714,112. Its commitments were estimated to amount to £5,750,000, including £3,640,000 for the construction of the Owen Falls civil engineering works. Preparatory to the construction of the scheme the Board was last year engaged on the provision of housing accommodation for both European and African staff, with a recreational centre which will include a restaurant and a swimming pool of modern design.

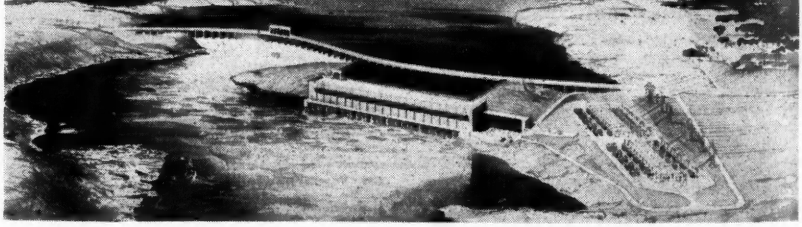
Labour lines have been built to accommodate some 1,200 Africans whose welfare is receiving the utmost consideration. The site of the scheme, the labour lines and the temporary thermal stations at Kampala and Jinja were last year visited by H.H. the Kabaka (local ruler in the province of Buganda) who has shown great interest in the development.

The number of consumers at 31st December was 4,143 compared with 3,263 a year before. A total of 10.8 million kWh was generated and 8.8 million kWh sold. There was a trading loss for the year of £5,488 and some revision of tariffs—still at the 1939 level—is foreshadowed.

An additional 2,600 kW of diesel-electric plant was commissioned at Kampala "B" and the first two sets at Jinja "B" were expected to be ready this March, with others to follow at monthly intervals to a total of about 11,000 kW. Extensions included the 33 kV lines Jinja-Lugazi; Jinja-Tororo; and Tororo-Mbale.

It is observed that the development of the mineral resources of the country offers the largest field for electrical expansion and Mr. O. G. Weller was last year appointed chemical engineer to the Board, while the services of Dr. A. J. V. Underwood are retained as consulting chemical engineer.

At the request of the Government the Board accepted responsibility as managing agents for the Uganda cement industry and placed contracts for the erection at Tororo of plant purchased at Trieste. It is not proposed that the Board should continue to control this enterprise after the needs of the Owen Falls scheme have been met.



Impression of the proposed Owen Falls hydro-electric development in Uganda

I.E.E. Wiring Regulations

Publication of Twelfth Edition

THE twelfth edition of the Regulations for the Electrical Equipment of Buildings of the Institution of Electrical Engineers has just been published and it supersedes, as from 1st May, the eleventh edition issued in December, 1943, reprinted with minor amendments in 1945, together with the 1946 Supplement and Revised Section 8 issued in 1948. Copies can be obtained from the Institution, Savoy Place, Victoria Embankment, London, W.C.2, price 3s 6d bound in paper or 5s cloth, postage 3d extra.

In the present edition the Regulations have been completely revised and recast, and the new Regulation 2 in the General Section enunciates much more completely the general principles on which the publication as a whole is based. Account has also been taken of numerous comments from individuals and organizations which have been received since the eleventh edition was first published, some of these proposals having already been embodied in the interim amendments issued from time to time. Apart from this, a number of further amendments have been made to take account of changes in practice, such as the increasing use of aluminium-sheathed cables

Economies Without Relaxation

Generally speaking, the new edition represents a consolidation and restatement of the previous one and its various supplements. The comparatively few changes of substance which are incorporated will have the effect of permitting further economies in the design of installations without relaxing the standards of safety which observance of the Regulations ensures. In the foreword the interim amendments issued since 1939 are enumerated and attention is drawn to the relationship between the Regulations and the Electrical Codes of Practice which are drawn up bv a committee convened by the I.E.E. Council and published by the British Standards Institution.

At the request of the Council, the Wiring Regulations Committee is examining the possibility of issuing a shortened version of the Regulations for installations in single family dwellings using a single-phase a.c. supply, which it has been suggested would be useful to those concerned only with the work of installation on site. A report on the Committee's findings will be presented to the Council in due course.

Additions and Amendments

With regard to some of the specific changes which have been made, the requirement in Section I on the control and distribution of the supply that in certain circumstances on a.c. installations no fuse, non-linked switch or non-linked circuit breaker shall be inserted in a pole connected to earth, has now been extended to corresponding d.c. installations.

The regulations for ring circuits are more or less the same as in the 1946 Supplement, but the number of 13 A socket outlets permitted on a final subcircuit having conductors of not less than 0.007 sq in cross-sectional area (7/.036) has now been raised from four to six. Provision has been made for installing fixed appliances on ring circuits subject to appropriate safeguards, and the use of the system has been extended to include other installations where the application of a diversity factor is justifiable as well as those in private houses and residential flats. A test for ring circuits has also been included in Section II.

The 1946 Supplement extended the Regulations to deal with polyvinylchloride (p.v.c.) insulated and sheathed cables. References to p.v.c. cables are now included wherever appropriate and attention has also been given to the use of aluminium in place of lead for cable sheathing. Furthermore, the requirements for cable colours in a.c. and d.c. circuits in Regulations 309-311 and the Regulations in Section 4 dealing with the installation of joint boxes have been simplified.

A new Table 20 gives half-hour and one-hour rating factors for vulcanized-rubber-insulated, paper-insulated and varnished-cambric-insulated cables when intermittently loaded and applies to cables having conductors with a cross-sectional area of not less than 0.0145 sq in (7/.052in) in circumstances in which it can be established that the appropriate time ratings will not be exceeded in service.

Regulation 1006 dealing with earth-leakage protection has been completely recast and Regulation 1001 now makes provision for the use of "double-insulated" portable appliances without earthing conductor, subject to compliance with a British Standard which has been approved for the purpose. Up to the present time, the only British Standard which has been so approved is B.S. 1645, which is about to be issued, for domestic vacuum cleaners.

The category "extra-low-voltage" which was included in the tenth edition has now been restored and this is defined as 30 V (r.m.s.) a.c. or 50 V d.c., and circuits and apparatus operating at or below these voltages are in most circumstances exempted from the requirements of earthing.

Regulations for controlling the earthing of electrical installations to metal water pipes and water mains, drawn up and approved by the Institutions of Civil, Electrical and Water Engineers, the British Waterworks' Association and the Water Companies' Association in 1938, have been included by courtesy of the Institution of Civil Engineers in an additional Appendix 4.

In conclusion, the requirements for electrode boilers in the new Regulations 711 to 714 have been extended to deal comprehensively with low-, medium-, and high-voltage installations.

B.E.A.M.A. Annual Meeting

IN his speech at the annual meeting of the British Electrical and Allied Manufacturers' Association on 20th April the chairman of the Council (Mr. H. W. Bosworth) first referred to the election of Sir George Nelson to the office of president which had been vacant since the death of Lord Derby in 1948. It had been decided that in future the office would be offered to eminent people within the industry and that normally no individual should be president for more than two years.

Mr. Bosworth then reviewed the principal points in the annual report (see *Electrical Review*, 21st April, p. 745). He then expressed his regret that he had been unable to give more attention to the Association's affairs during the year, owing to ill health, and thanked the vice-chairman (Mr. J. S. Ramsden) for his assistance. He voiced the Association's regret that Mr. Ramsden was retiring from the Council in three months' time.

After Mr. W. A. Coates had seconded the adoption of the report, the result of the ballot for the vacancies on the Council was announced. The members elected were: Berry's Electric, Ltd.; Brookhirst Switchgear, Ltd.; Ferranti, Ltd.; the General Electric Co., Ltd.; Lancashire Dynamo & Crypto, Ltd , the Micanite & Insulators Co., Ltd.; Nalder Bros. & Thompson, Ltd.; and A. Reyrolle & Co., Ltd.

Sir Vincent de Ferranti proposed a vote of thanks to the chairman, vice-chairman and Council. This was seconded by Mr. Alan Hirst, and Mr. Ramsden responded.

At a subsequent meeting of the Council the following additional firms were co-opted as members for the current session: The British Thomson-Houston Co., Ltd.; Chloride Batteries, Ltd.; the Electric Furnace Co., Ltd.; the Electrical Apparatus Co., Ltd.; Hick, Hargreaves & Co., Ltd.; Mather & Platt, Ltd.; "M.K." Electric, Ltd.; the Revo Electric Co., Ltd.; and Rockweld, Ltd. As we reported last week, Mr. G. Leslie Wates was elected chairman and Mr. I. R. Cox, vice-chairman.

I.E.E. South Western Sub-Centre

A ONE-DAY summer meeting of the South Western Sub-Centre of the Institution of Electrical Engineers will be held on 10th June, when a visit will be paid to the B.B.C. Radio Station, Washford Cross, returning to Exeter *via* Minehead. Lunch will be taken at Dulverton and tea at Minehead. For those travelling by coach the cost will be 18s per head, and for those using their own cars, 10s per head. Those wishing to take part are asked to notify Mr. J. E. Morley, 23, Victoria Park Road, Exeter, by 12th May.

PERSONAL and SOCIAL

News of Men and Women of the Industry

THE Governor of Uganda has approved the appointment of **Sir John Kennedy,** O.B.E., M.Inst.C.E., M.I.E.E., as acting chairman of the Uganda Electricity Board during the absence of **Mr. C. R. Westlake,** M.I.E.E., on long leave. Sir John Kennedy, who retired from the chairmanship of the British Electricity Commission in April, 1948, is the London member of the Board. Sir John and Lady Kennedy are expected to arrive in Uganda towards the end of June. Mr. Westlake leaves the Protectorate on 30th June and expects to return to Kampala early in October.

Mr. E. Player, managing director of Birmid Industries, Ltd., has been elected president of the Aluminium Development Association. **Mr. E. Austyn Reynolds** (T.I. Aluminium, Ltd.), is vice-president.

Mr. E. C. Green informs us that he has resigned from the position of manager of the Domestic Appliances Division of Thorn Electrical Industries, Ltd.

Mr. H. N. Wilson, assistant secretary to the Midlands Division of the British Electricity Authority, has now been appointed divisional secretary.

Mr. E. J. Batchelor, who for some years has been assistant managing director of Brush Coachwork, Ltd., has now been appointed managing director of the company.

Mr. G. E. Rhodes has been appointed deputy general manager of W. T. Henley's Telegraph Works Co., Ltd. He has been with the company forty-seven years and has been assistant general manager since 1943. **Mr. E. J. Vidler,** who succeeds Mr. Rhodes as assistant general manager, has been with the company nearly thirty - two years and has been sales manager since 1946. **Mr. F. V. Vaissiere** becomes sales manager in succession to Mr. Vidler. He joined the company in 1924 and has been chief assistant sales manager since 1946. **Mr. R. B. Hill** is appointed chief assistant sales manager. He has been with the company nearly thirty years, having been assistant sales manager in charge of the Rubber Cables Section before his present appointment. **Mr. P. G. Samels,** who succeeds Mr. Hill as assistant sales manager (Rubber Cables Section), has been with the company since 1917.

Mr. G. E. Rhodes

Mr. E. J. Vidler

Mr. F. V. Vaissiere

Mr. B. G. Crewe, Assistant Controller of the Board of Trade Patent Office, retired at the end of April after nearly fifty years' continuous service. Mr. Crewe is an international authority on copyright and on industrial property.

A complimentary dinner was given recently by Falk, Stadelmann & Co., Ltd., at the Trocadero Restaurant, to three senior members of the staff who retired on 31st March, 1950. **Mr. E. Barnard,** who has retired after fifty-three years' service, has been in charge of the Fittings Department for forty-five years. He was one of the founder members of the Electric Light Fittings Association. **Mr. E. J. Stockwell,** who has been with the company for forty-seven years, was a representative and subsequently formed the Illuminating and Technical Department. He remained in charge of this department until his retirement and represented the company on the E.L.F.A. Technical Committee and Technical Committee LGE/3 of the B.S.I. **Miss K. Blackburn** has served the company for forty-four years, practically the whole time in the Cashier's Department, of which she was in charge at the time of her retirement.

Mr. Barnard has been succeeded by **Mr. S. W. Boosey,** who was his assistant for a number of years. The Illuminating

Engineering Department has been reorganized and will be known as the Technical Department. **Mr. H. Punter,** who has served with the company for sixteen years as technical representative at the Birmingham branch, has been appointed manager, and **Mr. R. A. Hounslow** chief illuminating engineer.

Mr. R. W. Stuart Mitchell, M.Sc., A.M.Inst.C.E., A.M.I.Mech.E., has been appointed chief development engineer in the English Electric Co.'s Diesel Engine Division, with headquarters at Rugby. Mr. Mitchell received his technical education at the Royal Technical College, Glasgow, and his early training with the Haslam Foundry & Engineering Co., Derby, Newton Bros., Derby, and L. Sterne & Co., Glasgow. After serving as assistant design engineer with the British Polar Engine Co. at Glasgow, he became engineer in charge of development to Petters, Ltd., and the Brush Electrical Engineering Co., Loughborough. For a short period he was a lecturer in engineering at the Royal Technical College, Glasgow, and from 1947 he was lecturer in mechanical engineering in the University of Birmingham.

Mr. R. W. S. Mitchell

At the Convention of the Association of Electrical Machinery Traders held at the Spa Hotel, Buxton, on 25th and 26th April, **Mr. R. H. Gill,** of the Midland Dynamo Co., Ltd., Leicester, was elected chairman for the ensuing year, and **Mr. H. A. C. Hassall** (Electrical Power Maintenance Service, Ltd., Birmingham), was elected vice-chairman.

Mr. S. Broughton, managing director of Electrolux, Ltd., has left for an extended tour of the company's export markets in North, South, East and West Africa.

Mr. R. E. R. Luff has resigned from the Court of Directors of Cable & Wireless (Holding), Ltd., and has also resigned from the boards of associated companies.

At the annual general meeting of the Radio Industries Club, held at the Connaught Rooms, London, on 25th April, **Mr. Norman Collins** was unanimously elected president of the Club for 1950-51. Mr. Collins, who is Controller of Television of the British Broadcasting Corporation, took over the presidency from **Lord Burghley,** K.C.M.G., at a luncheon which followed the annual meeting. During the course of the luncheon a president's microphone, to be used at all future meetings of the Club, was inaugurated. The microphone is mounted on a specially designed table stand representing a lattice aerial mast, and at the base of the stand the names of all the presidents and chairmen of the Club to date are engraved. The microphone and stand are in gilt. At the first meeting of the new Committee held after the luncheon **Mr. Guy R. Fountain** was elected chairman.

Arrangements have now been made to receive entries for the **Electrical Industries National Golf Championship** for 1950. This annual championship is organized for the benefit of the E.I.B.A., and invitations to compete are extended to all male golfers in the electrical industry who have handicaps of 24 or less on any course with a minimum length of 5,000 yd. Entrants will play off preliminary rounds on their own courses, using score cards provided by area secretaries at 2s 6d each. The winners of each area trophy, together with the runner-up and the best scratch score competitor, will be entitled to compete in the national championship, which will be held at Addington Golf Club, Shirley Church Road, Addington, Surrey, on 26th September. Players of fifty-five years and over connected with the electrical industry are also invited to compete in an E.I.B.A. golf tournament for a trophy presented by the proprietors of the *Electrician*. Inquiries should be addressed either to a local E.I.B.A. Committee or to the Hon. Secretary for the Golf Championships, Mr. A. H. Hughes, 21, Bloomsbury Street, London, W.C.1.

Two performances of "To Kill a Cat," by Roland Pertwee and Harold Dearden will be given by the **Johnson Matthey Amateur Dramatic Society** at the King George's Hall, Tottenham Court Road, W.1, on 12th and 13th May. Tickets can be obtained from the company's head office at 73-83, Hatton Garden, E.C.1.

The Amateur Dramatic Section of the Victoria Works Athletic Club of **Johnson & Phillips, Ltd.,** recently presented "Fly Away Peter," a comedy in three acts by A. P. Dearsley, in the works canteen. The play was produced by Mr. F. Box. Among the audience were Mr. G. L. Wates, J.P., chairman of the company and Mr. W. Glass, joint managing director.

The annual spring dance held by the **London Students' Section** of the I.E.E. last Saturday at the North Hall, Bloomsbury Halls, London, W.C.1, was most successful. There was a record attendance and the 400 or more members and their guests spent a most enjoyable evening dancing to the music of Chris Stone's band. Mr. J. K. Langham, the Section entertainments

officer who organized the dance, is to be commended on making it less formal than on previous occasions. Mr. J. Shelley, Section vice-chairman, acted as M.C. and Mrs. P. W. Castle, wife of the Section chairman, presented prizes to the winners of the spot and elimination dances.

The annual staff social evening of the **Truman Electrical Co.** was held on 20th April at the Hatherton Masonic Hall, Walsall, eighty-five members attending. The toast of the Company was proposed by Mr. W. J. Webb, editor of the *Walsall Observer*, to which Councillor H. F. Truman, head of the firm, replied. Presentations were made to two employees who have completed twenty-five years' service with the firm.

The **Electron Players** of the Liverpool Electric Power & Lighting Sports & Welfare Club presented "To-morrow's Child," by John Coates, at the David Lewis Centre, Liverpool, in aid of the Electrical Industries Benevolent Association. The performance was well received and the E.I.B.A. will benefit by over £50.

OBITUARY

Mr. A. L. Vanneck.—The death occurred on 6th April in his fiftieth year of Mr. Arthur Louis Vanneck, A.M.I.E.E., for 25 years a member of the engineering staff of the General Electric Co., Ltd. Mr. Vanneck was educated at Westminster School and served in the Royal Flying Corps. He subsequently qualified for the diploma of the Institute of Mining Engineers. During his early days with the company he spent four years in Australia, where he assisted in the installation of several automatic exchanges. He returned to the Coventry Works in 1930 and during the last war was transferred to London where he was engaged on liaison duties between the various factories of the company and the Ministry of Supply. Some months ago he took charge of the London office (in Magnet House) of the G.E.C. Telephone Works.

The late Mr. A. L. Vanneck

Mr. J. W. F. Warren.—The death has occurred at his home at Middlesbrough at the age of seventy-eight of Mr. John W. F. Warren, M.I.E.E., founder of the electrical engineering firm of Warren, Beattie and Co., Middlesbrough. Mr. Warren, who retired eleven years ago, was born in Turkey and came to Britain as a young man. He founded Warren, Beattie and Co., in 1896.

Mr. J. F. Poynter.—The death occurred on 1st May, at the age of eighty-seven, of Mr. James Follet Poynter, who had been associated with the electric lamp industry for many years. Mr. Poynter joined the Maxim Lamp Works as sales manager in 1905 and became managing director in 1909. The name of the firm was changed to Poynter, Griffiths & Co., Ltd., and in 1939 it was again changed to its present title of J. F. Poynter, Ltd. Mr. Poynter retired in 1946.

WILLS

Mr. W. M. Skinner, retd. electrical engineer, formerly with the English Electric Co., Ltd., left £8,308 gross (£8,208 net).

Mr. A. M. Niven, A.M.I.E.E., of Bruce Peebles & Co., Ltd., who died on 31st Dec. last, left personal estate in England and Scotland valued at £9,950.

Institute of Fuel Luncheon

THERE was a very large gathering for the annual luncheon last week at the Connaught Rooms of the Institute of Fuel. Dr. D. T. A. Townend (president) occupied the chair and, in proposing the toast of "The Guests," expressed his pleasure at the strong representation of both educational and professional bodies, because training, education and further educational experience in practice must always be the responsibility of the technical institutions.

Eng. Vice-Admiral Sir Harold Brown (chairman, Fuel Research Board) responded with some observations on the duties of the Board he represented and its future with regard to the Ministry of Fuel and the nationalized industries. Overlapping, he explained, did not matter so much as duplication of effort, but he thought it should be easier to avoid those kinds of things now that nationalization was making closer relationships. If the sensible view prevailed, there should not be so much difficulty in preventing the loss of man-power that was involved in departmentalism. There should be a "free and independent" source of advice and information for inquirers overseas.

Dr. Townend subsequently delivered a formal presidential address, following the annual corporate meeting at which the report of the Council and statement of accounts for the year 1949 were presented. Mr. J. F. Ronca, who has been hon. secretary since 1945, succeeds Dr. Townsend as president from October, 1950.

CORRESPONDENCE

Letters should bear the writers' names and addresses, not necessarily for publication Responsibility cannot be accepted for the opinions expressed by correspondents

Convention Exhibition

MAY I refer to the editorial note on page 740 of your issue of 21st April, and say that it was decided by the Exhibition Committee that the general public should be admitted to the Exhibition on one day only—Friday, 23rd June.

It was also decided to give the Area Boards adjoining Yorkshire the opportunity of allowing all their commercial and other officers to visit the Exhibition during Convention week.

*London, W.*1. J. W. SIMPSON,
Secretary,
British Electrical Power Convention.

Bankside Fuel

ABSTRACT No. 7674 in a recent issue of the *B.C.U.R.A. Monthly Bulletin* quotes your statement that coal tar is to be used as fuel in the new Bankside power station. May we draw your attention to the fact that it is coal tar fuel which is to be used in this power station.

The distinction between these two terms may appear to you to be a fine one but the fact is that the term "coal tar" is usually applied to normal gasworks crude tar before it is distilled whereas coal tar fuel, in this case coal tar fuel 200, is a specially prepared refined product produced by the distillation of crude coal tar.

E. BRETT DAVIES,
MIDLAND TAR DISTILLERS, LTD.
Oldbury, Birmingham.

[In regretting this lapse, we may point out that our statement was that investigations were being made into the use of this fuel—not that it was to be used.—Editors, *Electrical Review*.]

Service Qualifications

IN your issue of 28th April "Reflector" raises an interesting question, *i.e.*, of what value in civil life are service qualifications?

I should say that electrical work in the services is like many other specialized branches of electrical engineering but I am afraid it is of little value in civil life, except perhaps to a few who are able to adapt themselves to civil requirements.

This question could be applied in many ways. Let us take say the case of a skilled armature winder. It does not follow that he is capable of dealing with faults outside the workshop, or in other words he does not have the experience of the "outside man" who cannot wind an armature. Similarly men who serve the whole of their apprenticeship as electricians in shipyards are rarely found capable of carrying out work for reputable contractors.

The field of electrical engineering has too many branches for one individual to master them all and indeed some of us are surprised at how little we know after being a lifetime in the business.

ALEX. MILNE, SENR.
Glasgow.

Auto-transformers

AN auto-transformer was recently installed in conjunction with a pilot motor in the following circumstances. The consumer's 230 V single-phase input was connected to the auto-transformer to bring the supply up to 400 V, single-phase, which was then fed to a normal pilot motor to provide artificial three-phase output at 400 V, 50 c/s.

The installation was wired and connected in conduit, v.i.r., with the necessary switch-fuses, distribution boards, etc., and was passed by the supply authority as being electrically sound. Subsequently the authority raised an objection to the installation of the auto-transformer, quoting I.E.E. Rule 708.

The final decision has not yet been made but this case raises the point that if this installation is condemned, would the same also apply to static phase convertors which also utilize an auto-transformer in conjunction with a condenser in almost the same capacity?

L. K.

VIEWS on the NEWS

By REFLECTOR

EVEN in pre-nationalization days the position of a consumer with "hire-purchased" appliances who moved to another district, was rather difficult. Endeavours were made by E.D.A. to arrange matters between the different electricity supply authorities and I believe that some success was achieved. Now that the industry is nationalized consumers find it harder than ever to understand why they cannot take their cookers, etc., with them and continue to pay for them to the new authority. I am glad to see that the Electricity Boards have got together and have agreed that a hire-purchase contract entered into with one Board shall be taken over by any other Board into whose area the consumer may transfer.

★ ★ ★

Mr. Alex. Milne, Senr., of Glasgow, has again opened up an old problem. It concerns the use of a dual lampholder for lighting and for small power purposes. He suggests that a fire rated at anything from 1 to 3 kW might be connected to the branch socket. The overloading of lampholders is entirely wrong, but the use of a branch outlet is very convenient to people who have no power points. Ordinarily the branch will be used only for an electric iron. If a fire is connected it will usually be of the small portable type rated at from 700 to 1,000 W. Of course the 4 A or so taken by a 1,000 W fire is too much for the lampholder springs and there is also a danger that fuses will be "strengthened" when such a fire is used. The use of dual lampholders cannot be stopped; what we must aim at is at least one power point in every room.

★ ★ ★

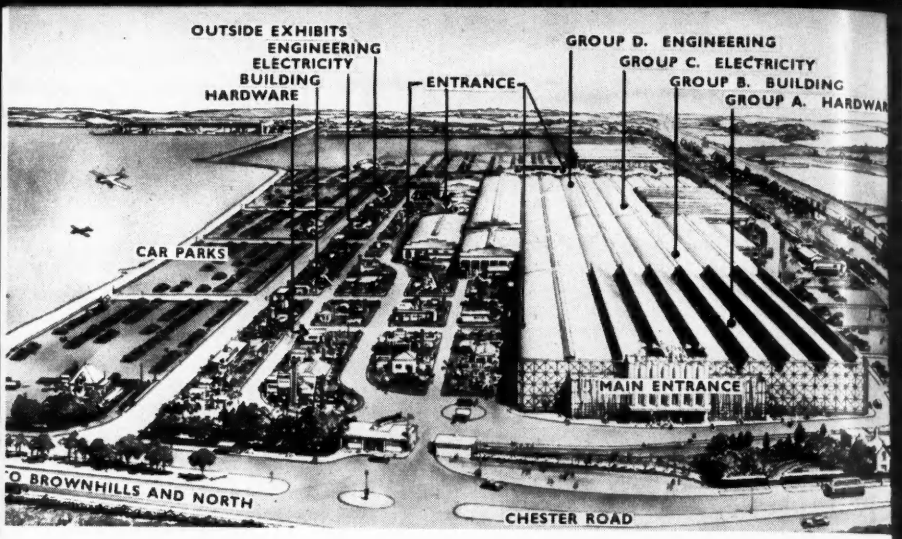
The late Henry Ford laid down a rule that customers for his cars could have them in any colour so long as it was black. In the United States refrigerator makers are counselled by the *Electrical World* to stick to their similar rule that customers must have white refrigerators. It appears that the Society of Industrial Designers is "sniffing around the idea of coloured refrigerators," but the *Electrical World* says that it has been tried and it doesn't work. "No matter how many tints and shades are offered the average housewife will want another colour. . . . When coloured appliances were tried some years back, dealers who first greeted them with loud huzzas soon found they were a pain in the pocket."

★ ★ ★

In the charming Suffolk village of Kersey, reputed to be one of the prettiest in the country, a fifteen-year wait for modern comforts in the form of an electricity supply has ended happily for all concerned. Previous plans have been opposed by the Suffolk Preservation Society and others on the grounds that the overhead lines would spoil the beauty of the village. Somehow the Eastern Electricity Board has now contrived to provide the one and safeguard the other by erecting the lines behind the houses, with cross-connections underground. The success of the installation—which I am sure could solve similar problems in other parts of the country—brought appreciative comments at the recent official switching-on ceremony when, to quote the local Press, demonstrations of cleaners, washing machines, radio sets, cookers, water heaters and small electrical appliances drew enthusiastic crowds.

★ ★ ★

Voltage reductions in the Midlands area unfortunately coincided with the distribution of a leaflet in which the Board incautiously said, "There is plenty of power available at this time of the year, so if there is a 'nip in the air' don't hesitate to make full use of electricity at the reduced price" (the reduction refers to the temporary rebate). The *Birmingham Evening Despatch* calls it "The unkindest cut . . ."



ELECTRICAL interest is greater than ever in the British Industries Fair which opens at Castle Bromwich, Birmingham, and Olympia and Earls Court, London, on Monday next and continues until Friday, 19th May. About six hundred manufacturers are showing electrical items, fifty more than last year, and brief details of these are given in the following pages.

Rather more than three-quarters of the electrical exhibits are to be seen at Birmingham and whilst they are, of course, concentrated largely in the Electrical Section (C) there are numerous displays warranting special attention in the other sections—Hardware (A), Building (B), and Engineering (D).

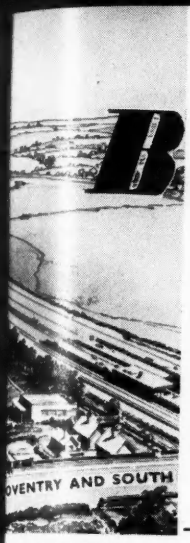
In London the greater portion of the 140 firms showing electrical products are at Olympia, where instruments, clocks, electro-medical apparatus, office equipment, lighting fittings, and radio apparatus are mainly to be found. Vacuum cleaners and plastics form special displays at Earls Court.

As usual the *Electrical Review* has a stand at Castle Bromwich, in the same position as last year, C.614 (telephone Fair 533), where our staff will be happy to answer queries or assist exhibitors or visitors in any other way possible.

The arrangements for admission to the Fair are much the same as last year. All sections are open to trade buyers each week-day from 9.30 a.m. until 6 p.m., except on the last day when the Birmingham Section will close at 4 p.m. At Castle Bromwich, where the price of admission is 2s 6d, the general public is admitted every day after 2 p.m., except on Saturday, 13th May, which is organized party day (parties of no fewer than twenty, 1s 6d per head) when the Fair is open to the public all day. The London Sections are open (all day) to the public on two days only this year (instead of three last year)—Saturday, 13th May, and Wednesday, 17th May. The price of admission is 1s 6d for each of the two sections.

Special trains are being run daily from London (Euston) to Castle Bromwich at 8.20 a.m. (third class only) and 8.45 a.m. (first class only), returning from Castle Bromwich at 6.5 p.m. and 6.10 p.m. respectively. In addition regular air services will operate between Castle Bromwich and London and Castle Bromwich and South Wales. Details of these can be obtained from any office of Thos. Cook & Sons, Ltd.

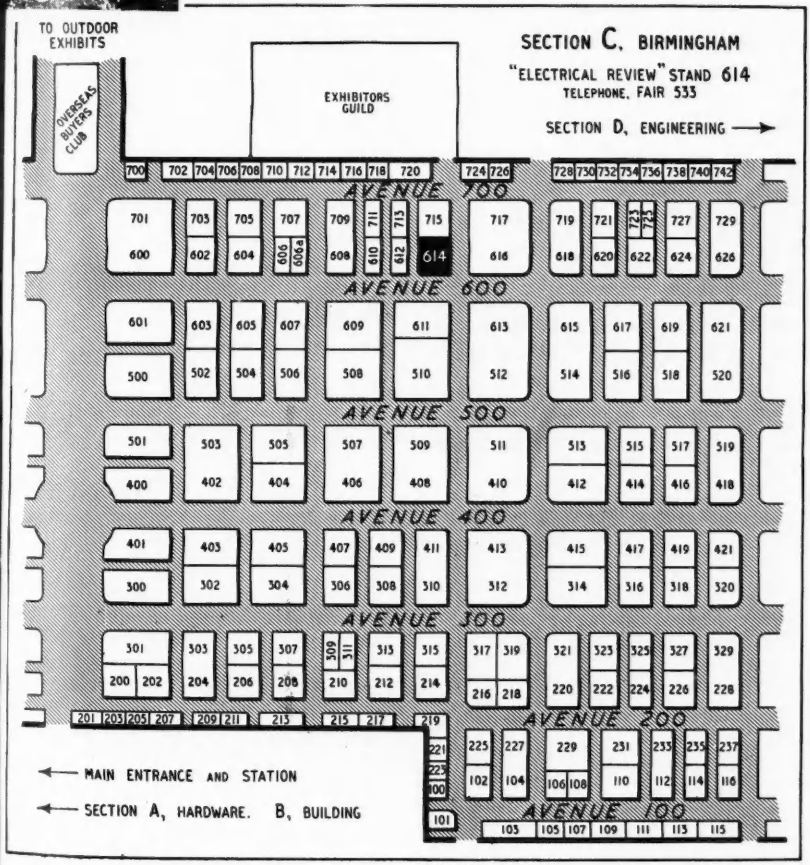
Buses leave the Chamber of Commerce every few minutes from 8.30 a.m. and a special bus meets the London train arriving at Snow Hill at 11.15 p.m.



B.I.F

A Guide to the Electrical Exhibits

At Birmingham and London Next Week



Exhibits at Birmingham

Wide Range of Electrical Products

A.C.E. Machinery, Ltd., Porden Road, London, S.W.2. **D.235, and Outdoor 1209/1108.** — **Hoi**sts, elevators, winches, capstans, etc.

A.T. Instruments, Ltd., Cricklewood Works, London, N.W.2. **D.727.**—Revolution counters, tachometers, counters, etc.

Abrasive Rubbing Machines, Ltd., Norgren Works, Shipston-on-Stour. **D.244.**—Suspension for power tools, eliminating operation fatigue and damage to equipment due to careless handling.

Accles & Pollock, Ltd., Oldbury. **D.617/516 and D.619/518.**—Cold drawn seamless tubes in steel, stainless steel and alloys, ranging from high precision small diameter tubing for scientific instruments to stainless tubes up to 7in in diameter.

Aeraspray Manufacturing Co., Ltd., 179-213, Thimble Mill Lane, Birmingham, 7. **D.734.**—Electrostatic spray painting equipment, spray guns, air rectifiers, pressure feed containers, turntables, new equipment for the application of very heavy materials and new water wash spray booths.

Aerlec (Aluminium), Ltd., 12, Greek Street, London, W.1. **D.524.**—Aluminium alloys, die castings, extrusions, etc.

Aerograph Co., London, S.E.26. **D.302.**—Paint spray equipment.

Aeronautical & General Instruments, Ltd., Purley Way, Croydon. **D.121.**—See Neville's (Liverpool), Ltd.

Air Industrial Developments, Ltd., Shenstone, Staffs. **D.114.**—Besides portable and fixed compressor plant, there is a working model of water wash spray booth complete with conveyor and drying oven.

Airscrew Company & Jicwood, Ltd., Weybridge. **D.726.**—Axial flow and centrifugal fans, and dust collector unit.

Aiton & Co., Ltd., Derby. **D.608.**—Examples are shown of pipework for the highest operating conditions encountered in modern power stations. To illustrate the variety of metals in which the company is working a corrugated bent pipe made from aluminium tube and a stainless steel bellows expansion joint are included in the display. A steam trap with a forged alloy steel body is designed to operate with steam in the 900 lb/sq in, 900 deg F range.

Aladdin Industries, Ltd., Greenford. **A.428.**—The internal construction of a new electric radiator (illustrated) ensures even distribution of heat without recourse to any liquid whatsoever. The two 750 W elements are completely enclosed, but owing to an internal reflector, are visible through an opening in the front.

E. P. Allam & Co., Ltd., and **Allam Road Plant, Ltd.,** 45, Great Peter Street, London, S.W.1. **Outdoor 1207/1106.**—Electric vibrators (illustrated) of various types are available for the rapid consolidation and surface finish of concrete and also for maintaining the flow of materials. "Planet" friction winches, platform hoists and concrete elevating gear powered with electric motors are extensively used in building and civil engineering. Portable generating sets range from 1.5 kVA to 6.25 kVA.

Wm. Allday & Co., Ltd., Alcosa Works, Stourport-on-Severn. **D.505.**—Fans.

Edgar Allen & Co., Ltd., Imperial Steel Works, Sheffield, 9. **D.534.**—Tools, dies and permanent magnets.

Allied Metals, Ltd., 62, London Wall, London, E.C.2. **B.205.**—See Barrywald Appliances, Ltd.

Aluminium Industries, Ltd., Lion Works, Engine Lane, Lye, Worcester. **A.506.**—"Lion" electric kettles and hollow-ware.

Anglow Electrical Appliances, Ltd., 241/43, Heigham Street, Norwich. **C.233.**—Water heaters, cookers, convector heaters, fires, kettles, inset and panel fires.

Applied Heat Co., Ltd., Elecfurn Works, Watford By-Pass, Watford. **C.321/220.**—Even heating and cooling of the "Grafton" electric pottery kiln "EP 2" have been achieved by special attention to the use of correct insulation and refractory materials in proper proportions in conjunction with adequate heating elements. Temperatures up to 1,300 deg C for standard models and 1,350 deg C in special models can be provided.

Applied High Frequency, Ltd., Actarc Works, Goldhawk Road, London, W.12. **D.416.**—Industrial high-frequency induction heating equipment.

Arc Manufacturing Co., Ltd., Actarc Works, Goldhawk Road, London, W.12. **D.416.**—Welding equipment, transformers, electrodes and accessories.

Associated British Oil Engines, Ltd., 32, Duke Street, London, S.W.1. **D.637/536 and Outdoor 1346.**—The main attraction is four new engines. The "Meadows" 970, a six-cylinder supercharged diesel with a traction rating of 250 b.h.p. at 1,650 r.p.m., is suitable for use in diesel-electric generator sets. The "Petter-Fielding" horizontal DH diesel engine, a single-cylinder totally enclosed four-cycle direct-injection oil engine developing 16 b.h.p. at 800 r.p.m., is designed to operate lighting sets, etc. The "Mirrlees" J6 vertical diesel engine, which develops 420 b.h.p. at 750 r.p.m., is shown coupled to a "Brush" 290 kW alternator with overhung exciter carried upon a single pedestal bearing: suitable controlling switchgear is provided. The fourth new diesel engine is the small "Petter" AVA air-cooled vertical diesel engine in both single- and twin-cylinder forms having a range of 3 to 10 b.h.p. at 1,000/1,500 r.p.m. These engines are equipped with half-speed extension shafts.

Astral Equipment, Ltd., 150, Hope Street, Glasgow, C.2. **C.101.**—The Astral "Baby" refrigerator (illustrated), though measuring only 22½in by 22in by 21¼in and weighing less than 60 lb has a storage capacity of 1½ cu. ft. It operates on the absorption principle.

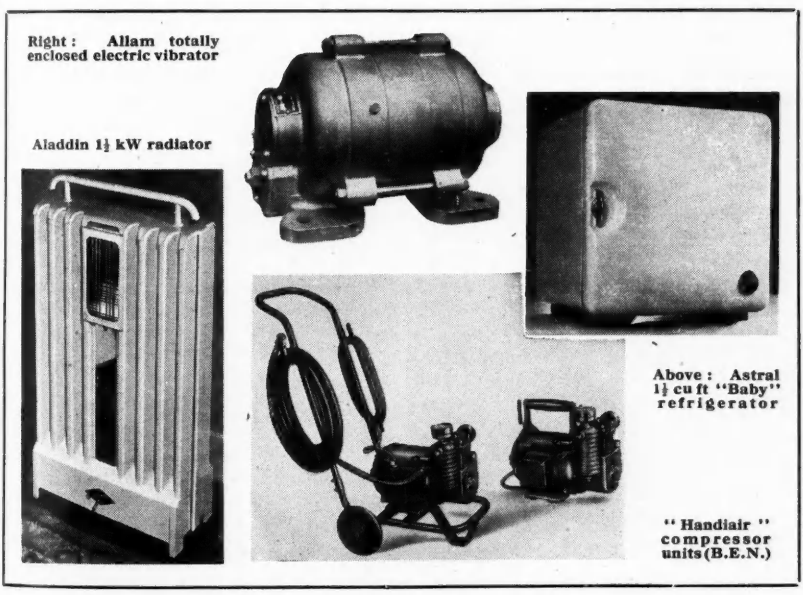
Austinlite, Ltd., Lighthouse Works, Smethwick. **C.622.**—Rotary switches are made for 15/30 A and 25 A.

Auto Diesels, Ltd., Uxbridge. **Outdoor 1323/1222.**—Of special interest among generating and lighting equipments is the new "X" range of low-priced diesel-engined equipments, for fully automatic operation. Self priming centrifugal pumps from 1½in to 8in are also exhibited.

C. R. Averill, Ltd., 22, Duchy Street, London, S.E.1. **C.202.**—"Avarc" pure flake lubricating graphites, graphite pipe joint compound and graphite greases, silica-graphite paints, heat-resisting and chemical-resisting paints, etc.

W. & T. Avery, Ltd., Soho Foundry, Birmingham, 40. **D.523/420.**—Apart from weighing machines there are instruments for testing raw materials and finished goods for tensile and compression strength, hardness, impact, torsion and fatigue. Dynamic balancing machines are also shown.

B.E.N. Patents, Ltd., High Wycombe. **D.431.**—Electrically driven equipment for light industry, the building and decorating trades and the motor industry includes stationary and portable compressors displacing from 2 to 41 cu ft and portable



Right: Allam totally enclosed electric vibrator

Aladdin 1½ kW radiator

Above: Astral 1½ cu ft "Baby" refrigerator

"Handiair" compressor units (B.E.N.)

spray painting units. The new "Handiair" portable unit (illus. p. 859), though designed for the small garage and commercial studio, is equally useful for the home, whilst the "Handispray" general-purpose machine has a variety of uses.

B.I.F. Engineering Co. (1940), Ltd., 212, Aston Road, Birmingham, 6. **A.622.**—In addition to motor-driven air compressor sets and similar equipment this company shows an electrically heated wax spraying pistol.

B.I.P. Tools, Ltd., Tyburn Road, Birmingham, 24. **C.327.**—Moulds, induction heated platens and induction coils, tools and dies for the plastics moulding industry.

B.K.B. Electric Motors, Ltd., St. George's Works, Icknield Street, Birmingham. **C.606a.**—Motors from fractional h.p. to 7½ h.p., a.c. or d.c., generators and alternators up to 6 h.p. Special types are built to customers' requirements. Of special interest are sewing machine outfits, complete with motors, controls and needle lights.

B.V.C. Industrial Constructions, Ltd., Africa House, Kingsway, London, W.C.2. **D.203/102.**—Flue dust removal plant, pneumatic and mechanical conveying plant and ash sluicing plant.

Babcock & Wilcox, Ltd., Babcock House, Farringdon Street, London, E.C.4. **D.407/306.**—Besides the new "Cyclone" furnace there is a model power station with four 240,000 lb/hr high-head boilers operating at 650 lb/sq in and 850 deg F. There is also a section of a double-bank multiloop economizer.

Bakelite, Ltd., 18, Grosvenor Gardens, London, S.W.1. **C.404.**—Mouldings for the electrical industry range from miniature moulded bobbins to television cabinets.

H. J. Baldwin & Co., Ltd., 615, Mansfield Road, Nottingham. **C.516.**—The new Behm-Wireohms element winding machine is shown working, in addition to the large range of heating elements manufactured by the associated company, Wireohms, Ltd. Underground fuse or link disconnecting boxes, pole mounting boxes and overhead line accessories and a feeder pillar are also displayed, with interlocking and self-locking cable protection covers and an extended range of concrete units for protecting and identifying buried cable. The Canadian subsidiary, H. J. Baldwin of Canada, Ltd., is finding a steadily increasing market for the company's products.

"Bank" Hardware Manufacturing Co., Ltd., Pleck Road, Walsall. **A.325.**—A table lamp for use when television programmes are in progress is among a display of lamps, irons, toasters and fires.

Barford (Agricultural), Ltd., Grantham, Lincs. **A.305.**—A hedge trimmer can be driven from a 110 V generator mounted on the company's "Atom" tractor.

Barlow-Whitney, Ltd., Coombe Road, London, N.W.10. **C.210.**—This company specializes in electrically heated industrial plant (illustrated) examples of which include ovens for drying, stoving, curing, etc.; vacuum and pressure impregnating plants; a new humidity test cabinet; a small furnace for hardening, etc.; white metal pots, and hot oil circulators.

Barries Electrical Agencies, Ltd., King Street, Brighton, 1. **C.102.**—New lines are on/off and stop pushbuttons, limit switches, and "Dexray" switchgear, which includes 15 to 100 A distribution boards and switch fuses and 15 to 45 A splitters. Also shown are "Barlecta" cables, bell pushes and motors; and products of the company's principals, George Turnock, Ltd. ("Tunion" bakelite accessories), and Scupham & Wood, Ltd., (wood blocks).

Barrywald Products, Ltd., 62, London Wall, London, E.C.3. **B.205.**—The Barrywald electric sanitary incinerator.

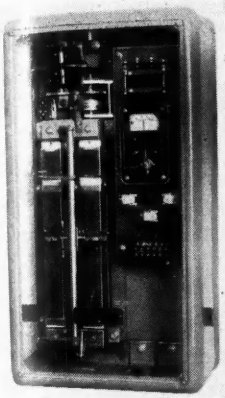
Bastian & Allen, Ltd., Ferndale Terrace, Harrow, Middlesex. **C.710.**—Electrode steam boilers with outputs from 100 lb to 4,500 lb of steam per hour are accompanied by various hot water boilers arranged with both handwheel and automatic adjustment of the load. A standard 70 kW boiler illustrates the principle of a new pressure control which varies the load automatically between 10 and 110 per cent of the full load rating within a slight pressure range. Wall mounting non-pressure type electric storage water heaters and immersion heater elements, are also shown.

Belling & Co., Ltd., Bridge Works, Enfield. **C.515.**—Fires of modern and period design include imitation coal and portable types. Among cookers are models on wheels for easy-cleaning, units with inner glass doors, and the well-known "Baby Belling." Food warming cabinets, towel rails and clothes' drying cabinets are also shown.

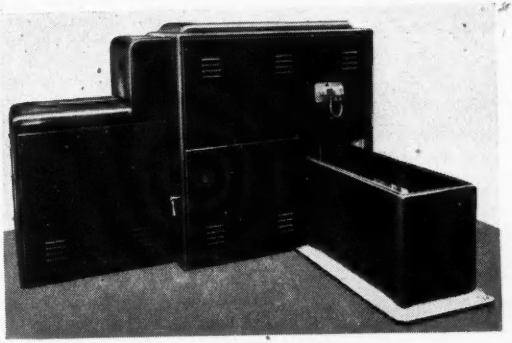
James Beresford & Son, Ltd., Kitts Green Works, Mackadown Lane, Marston Green, Birmingham, 7. **C.233/112.**—Electric pumps include submersible types.

Lewis Berger & Sons, Ltd., 35, Berkeley Square, London, W.1. **B.621/518.**—"Hymeg" insulating varnishes.

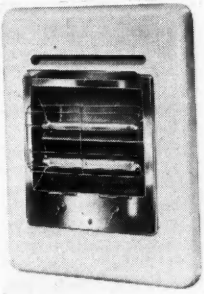
Berry's Electric, Ltd., Touchbutton House, Newman Street, London, W.1. **C.507/406.**—New ceiling pendants, wall brackets, table and floor standards include carved chandeliers, designs in wrought iron, brass and hewn oak, fabric shades and



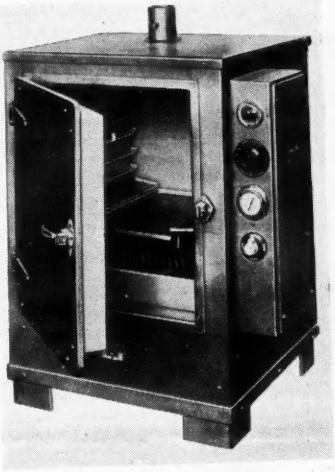
Above : Berco/B.P.T. 6 kVA voltage stabilizing equipment



Birlec shaker hearth furnace

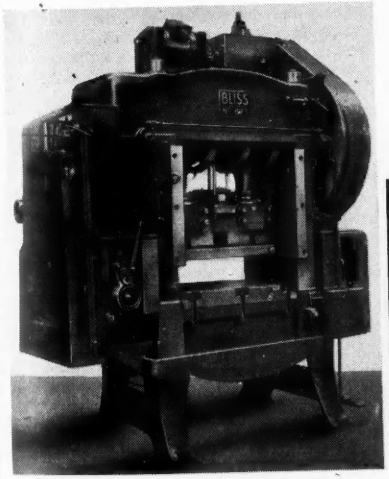


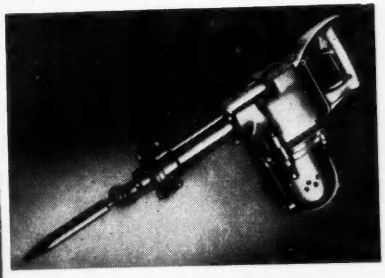
Right : Bratt Colbran "252" panel fire



Barlow Whitney standard box oven

Below : Bliss press used for making motor laminations





Black & Decker 2in portable hammer

modern decorative glassware. Besides an increased number of "Magicoal" period reproduction fires there are two new low-priced "Magicoal" types, as well as "Haloberry" radiators. A new immersion heater accompanies the 1½ gal flat-backed and flush-fitting "New Look" storage heater, which is available in attractive colours to tone with modern bathroom and kitchen decorations. The switchgear section displays "Viking" switch fuses.

F. H. Biddle, Ltd., 52, Clerkenwell Close, London, E.C.1. **B.328.**—"Univectair" and "Vectair," heaters, hand dryers and ventilating fans.

Birkbys, Ltd., Liversedge. **C.417.**—"Elo" plastic products, including mouldings and moulding powders; resins, solid, powdered or in solution; insulating varnishes; cements; lacquers; anti-friction resins; capping cements; filling compounds and sealing fluids.

Birlec, Ltd., Tyburn Road, Birmingham, 24. **D.509/406.**—Of the six exhibits shown five are working. Various minor modifications have been incorporated in the 20 kW shaker hearth furnace (illus. p. 861) seen bright-hardening small steel components. Copper brazing is being carried out in a 10 kW 4in belt conveyor furnace in a protective atmosphere generated from an endothermic gas plant. A 25 kW h.f. induction hardening unit is hardening automobile gear box sleeves, while a 6 kW h.f. spark gap set with 1 lb crucible is melting cast iron. A laboratory size Birlec Detroit indirect arc furnace has a capacity of 10 lb.

Birmingham Battery & Metal Co., Ltd., Selly Oak, Birmingham, 29. **D.514.**—Tubes for condensers, refrigerators, etc.

Birmingham Welding Co., Ltd., Chester Street, Aston, Birmingham. **D.533.**—Switchgear and fusegear castings, fabrication in all metals.

Bitulac, Ltd., Collingwood Buildings, Newcastle-upon-Tyne, 1. **B.710.**—Stoving enamels are demonstrated by an infra-red dipping and stoving machine.

Black & Decker, Ltd., Harmondsworth. **C.607.**—Among portable electric drills, drill stands, electric screwdrivers, bench and portable grinders, a 7in sander, "Ripsnorter" saws, a 16 gauge "Lectro-Shear" and an electric valve shop are portable electric hammers (illus. p. 861), suitable for drilling, chipping, chasing and breaking through in concrete, brick or composite materials. The new "Handy-Utility" tools are introduced for the small business or one-man workshop.

W. Blackwell Oil Co., Victoria Oil Works, Aston, Birmingham. **C.221.**—Lubricating, transformer, switch, etc., oils.

Blaw Knox, Ltd., Clifton House, Euston Road, London, N.W.1. **Outdoor 1303/1202.**—Construction equipment, including mixers, pumps, etc.

Blending Machine Co., Ltd., 3, Bond Street, Birmingham, 19. **C.605.**—Magnetic separating equipment.

E. W. Bliss (England), Ltd., City Road, Derby. **D.603.**—The No. 675 high-production press (illus. p. 861) is widely used for making motor laminations.

Bolco Refrigeration, Ltd., Brockhurst Works, Bescot, Walsall. **A.502.**—Refrigerators and components.

Thomas Bolton & Sons, Ltd., Mersey Copper Works, Widnes. **D.745.**—Products of special interest are trolley wire sections, "Combarloy" for commutator segments, rail bonds for electric traction, 2- and 3-pole equalizer bars, tungsten carbide dies, extruded and drawn sections and machined parts.

Boucher & Co., Ltd., Pike Mills, Green Street, Kidderminster. **D.152.**—Cable racks and brackets.

S. O. Bowker, Ltd., 19-21, Warstone Lane, Birmingham. **C.705.**—Special attention is drawn to the method of mounting Tenby "Pilot" flush switches which automatically ensures flush mounting. A new 15 A 3-pin shallow switch socket combines many interesting new features and a new bonding clamp is now fitted as standard to certain types of junction boxes to enable cables of varying external diameters to be securely bonded under one clamp.

F. W. Brackett & Co., Ltd., Hythe Bridge Ironworks, Colchester. **D.245.**—Automatic rotating screens for power stations are seen in operation. Small self-lubricating plunger pumps are also shown.

Bradley & Turton, Ltd., Caldwall Works, Kidderminster. **D.239.**—Machinery for the plastics industry includes a new self-contained 150 ton press, and two automatic control units coupled to a downstroking and an upstroking press respectively.

Bratt Colbran, Ltd., 10, Mortimer Street, London, W.1. **C.504.**—The "Sunrise" fire, which radiates heat from glowing refractory "coals," is now fitted with a flicker device and is available in brass and rustless steel for period settings. A new panel fire, the 252 (illus. p. 861) is fixed simply by four wood screws, no cutting of the wall being required. A convection system ensures that the surround remains cool and reduces discolouration of the wall. Convectors, inset fires in rustless steel, bathroom fires and portable models complete the "Solectra" range.

Geo. Bray & Co., Ltd., Leicester Place, Leeds, 2. **C.412.**—There is a large selection

of metal clad embedded ring, strip, and sheathed wire type heating elements. Parts of machines and complete apparatus give an idea of the wide variety of applications of the elements. Repetition machine parts and gear trains represent another side of the company's business, while the Insulator Department shows quantity produced small insulators made to precision limits, compromising beads, bushes, washers, small terminal and resistor supports for domestic and industrial heating equipment; low loss steatite and standard steatite for telecommunication apparatus insulators and a rutile body for capacitor dielectrics. Refractory supports and tubes for temperatures up to 1,600 deg C for radio valves, cathode insulators, thermocouples and pyrometer leads are other specialities.

British Aluminium Co., Ltd., Salisbury House, London, E.C.2. **D.605.**—Special attention is drawn to large plate and thin strip aluminium and aluminium alloys.

British Celanese, Ltd., Hanover Square, London, W.1. **A.327/226.**—Textiles and plastics for electrical applications.

British Central Electrical Co., Ltd., 6 and 8, Rosebery Avenue, London, E.C.1. **C.107.**—A wellglass gripper handlamp has been designed for use in damp conditions and in fume-laden and corrosive atmospheres.

British Electric Resistance Co., Ltd., Queensway, Ponders End. **C.208.**—Products include vitreous enamelled fixed resistances capable of withstanding extremes of atmospheric conditions, fixed wire wound resistances wound on mica cards, vitreous enamelled steel formers and electrical porcelain. Variable resistances are shown in sliding and rotary forms from 4 W up to 5 kW capacity. A new product is the "Regavolt" transformer from which an infinitely variable voltage can be obtained. The company undertakes for customers vitreous enamelling work for electrical insulation purposes. The associated British Power Transformer Co., Ltd., shows power distribution and industrial transformers and voltage regulating equipments which are proving extremely successful in overseas markets. The pole mounted rural distribution transformers hermetically sealed in stoneware containers, have high insulation strength and withstand severe atmospheric conditions. Single-phase pole mounting transformers of 15 and 25 kVA housed in circular steel tanks have been specially designed to American standards for export to Canada and the U.S.A. Berco/B.P.T. voltage stabilizing equipment (illus. p. 861), consisting of the motor-driven "Regavolt" transformer automatically controlled by a voltage sensitive relay, is made for wall and floor mounting.

British Electric Transformer Co., Ltd., 95, Aldwych, London, W.C.2. **C.609.**—See Crompton Parkinson, Ltd.

British Electrical Development Association, 2, Savoy Hill, London, W.C.2. **C.509/408.**—Demonstrations of some of the latest applications of electricity are given on this stand, which serves as an inquiry bureau.

British Emulsifiers, Ltd., 12, Greek Street, London, W.1. **A.524.**—The "Bel Empire" power-driven emulsifier incorporates a non-choke emulsifying unit with pressure adjustable up to 3,000 lb per sq in. It has an output of 15 gal per hour.

British Ermeto Corporation, Ltd., Beacon Works, Hargrave Road, Maidenhead. **D.723.**—High pressure couplings and valves.

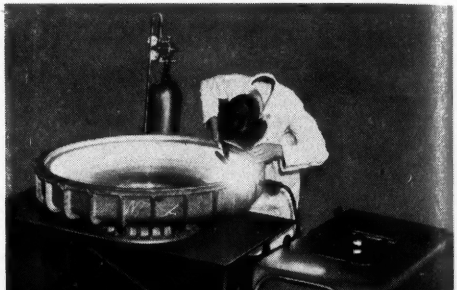
British Federal Welder & Machine Co., Ltd., Castle Mill Works, Dudley. **C.317.**—Resistance welding sets are demonstrated.

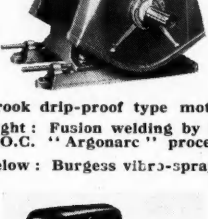
British Foreign & Colonial Automatic Light Controlling Co., Ltd., 100, Holdenhurst Road, Bournemouth. **C.217.**—Time switches for street and shop window lighting, signs, water heating, space heating, etc., include heavy capacity models employing mercury break contacts. An electrically wound type with spring reserve is of special interest. Process timers cover time ranges from seconds to hours.

British Insulated Callender's Cables, Ltd., Norfolk House, Norfolk Street, London, W.C.2. **C.314 and C.413/312.**—Among the larger cables shown are oil-filled, impregnated pressure, and solid type h.v. types, of particular interest being a 3-core, 33 kV aluminium sheathed impregnated pressure cable which is more economical, lighter and smaller than the conventional lead sheathed type. Smaller cables comprise ranges specially designed for industrial, ship and aircraft wiring, railway signalling, mining, telecommunication and public address installations. Particularly noteworthy is a polythene insulated multicore television camera cable for outside broadcasts. Winding wires are represented by cotton and silk and enamelled wires and the new synthetic enamel insulated "Bicalex" wires. Losses of B.I.C.C. power capacitors for industrial power-factor improvement also shown are guaranteed not to exceed 1.3 W per kVAr. Electric resistance welders demonstrated include both bench and floor type, spot, butt and projection welders and also fine wire and fine wire brazing machines. "Bicaloy" electrodes complete the display.

British Jeffrey-Diamond, Ltd., Wakefield. **D.526.**—A recent addition to the company's range of crushing, pulverizing and grinding machines is the streamlined "Midget Atomill" fine grinder, which though originally designed for laboratory work, is robust enough for small batch production.

Brook drip-proof type motor.
Right: Fusion welding by the B.O.C. "Argonarc" process.
Below: Burgess vibro-sprayer





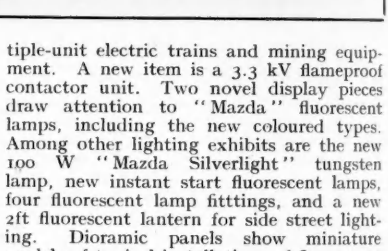
British Moulded Plastics, Ltd., Walthamstow Avenue, London, E.4. **C.612.**—Moulded plastics.

British Non-Ferrous Metals Federation, 132, Hagley Road, Birmingham, 16. **D.219.**—This stand serves as an information bureau.

British Oxygen Co., Ltd., Bridgewater House, Cleveland Row, London, S.W.1. **D.201/100.**—Demonstrations are given of the "Argonarc" welding process (illustrated) which permits the fusion welding of aluminium and other light alloys without using a corrosive type of flux.

British Power Transformer Co., Ltd., Queensway, Ponders End. **C.208.**—See British Electric Resistance Co., Ltd.

British Thomson-Houston Co., Ltd., Rugby. **C.511/410.**—Exhibits range from an electro-magnetic train control unit, 11-kV and 3.3-kV switchgear, and mining electrical equipment, down to fractional h.p. motors, electric tachometers and magnetos. Industrial motors, including low-speed motor units (illustrated); control equipment; suds pumps; thrustors; an "Emotrol" (electronic motor control) unit; photo-electric relay equipment, and "Fabroil" silent pinions are backed by a stand design incorporating large photographs of heavy electrical plant. There is a scale model of a 275 kV power transformer being constructed for the Staythorpe generating station. Working demonstrations include electro-pneumatic camshaft control for multiple-unit electric trains and mining equipment. A new item is a 3.3 kV flameproof contactor unit. Two novel display pieces draw attention to "Mazda" fluorescent lamps, including the new coloured types. Among other lighting exhibits are the new 100 W "Mazda Silverlight" tungsten lamp, new instant start fluorescent lamps, four fluorescent lamp fitttings, and a new 2ft fluorescent lantern for side street lighting. Dioramic panels show miniature models of typical installations of fluorescent lighting, and street-lighting lanterns may be seen outside the exhibition building.



B.T.H. 1 h.p. low-speed motor unit

British Trane Co., Ltd., 52, Clerkenwell Close, London, E.C.1. **B.328.**—See F. H. Biddle, Ltd.

British Tyre & Rubber Co., Ltd., Herga House Vincent Square, London, S.W.1. **D.615.**—"Silvertown" ebonite mouldings, sheet, tube and rod, have many electrical and electronic applications, including battery boxes, electrical fittings and components for h.v. test equipment. "Silvonite" silica-loaded ebonite compound is in demand for electrical instruments where surface leakage is of great consequence.

British Vacuum Cleaner & Engineering Co., Ltd., Leatherhead. **A.520 and D.203/102.**—Besides "Goblin" domestic washing machines, heat-controlled irons, etc., there are flue dust extraction plant, sack cleaning plant, and industrial portable vacuum cleaners, ranging from those used in cinemas, hospitals, etc., to the heavier factory models, including the "T.5" vacuum chimney sweeping machine.

Bromak Pneumatic Paint Brush, Ltd., 79, Morland Road, Croydon. **B.704.**—Paint spraying equipment and compressors.

Brook Motors, Ltd., Empress Works, Huddersfield. **C.304.**—A comprehensive display of a.c. electric motors from 0.25 to 200 h.p. in various enclosures includes types for special purposes. New items are the downdraft drip-proof motor (illustrated), a completely redesigned loom motor range, a fractional h.p. dental motor and a fractional h.p. grinder. The "Cylent" motor with oil-ring sleeve bearings is re-introduced for applications where quiet running is essential. Six additions to the starter range, all of the automatic pushbutton operated type, combine robustness with pleasing appearance and compactness, making them adaptable for incorporation in machines or for normal wall mounting. Of special interest for the dollar market is a motor designed to N.E.M.A. standards and having Canadian Standards Association approval.

J. Broughton & Son (Engineers), Ltd., Vere Street, Birmingham, 5. **D.610.**—Industrial safety equipment includes press guards, milling machine guards, warning systems, and a new device for the prevention of the removal of guards before the moving parts have lost momentum.

David Brown & Sons (Huddersfield), Ltd., Huddersfield. **D.343.**—A turbine casing accompanies gears and gear units, gear-cutting and measuring tools, "Radicon" worm reducers, and geared motors.

Brown's Clipper Co. (1939), Ltd., Electric Avenue, Witton, Birmingham. **D.713 and Outdoor 1311/1210/1337/1236.**—Electric toilet clippers.

Brush Electrical Engineering Co., Ltd., Loughborough. **C.519/418.**—Seven motors include drip-proof and flame-proof types. Three alternators shown are the O.N.S.91 machine, 400 V, 50 cycles, 3 phase, 344 kVA; the M.D.50.48. d.c. generator, 220 V, 190 kW, 600 r.p.m. and the O.T.S. 448 alternator, 1·24 kVA, 1,500 r.p.m. Stages in the manufacture of a standard 500 kVA 3 phase 50 cycle transformer are demonstrated, while switchgear is represented by a vertical draw-out unit type VA5; a six circuit A.F. cubicle type switchboard; an l.v. vertical draw-out unit type VU30; a vertical draw-out compound filled unit type VC5; a truck portion of a VA5 unit; an outdoor pattern h.v. ring main unit; and an A.F.U. switchboard.

Bulpitt & Sons, Ltd., 132, Icknield Street, Birmingham, 18. **A.417 & C.506.**—Kettles, saucepans, glue pots, urns, percolator sets, irons, fires and cooking utensils.

Burco, Ltd., Rose Grove, Burnley. **C.308.**—Minor improvements and refinements have been made to the company's range of wash boilers, a porringer boiler and an electrically heated hand-operated washing machine. The de-luxe series of wash boilers and the washing machine are shown in white and cream enamel.

Burgess Products Co., Ltd., Brookfield Road, Hinckley, Leics. **D.120.**—A new low priced electric paint spray (illustrated) is displayed with acoustical materials, silent booths, microswitches and engineering tools.

George Burn, Ltd., Rabone Lane, Smethwick. **B.309/208.**—Electrical conduit.

C.A.V., Ltd., Warple Way, London, W.3. **C.501.**—Among electrical equipment for commercial and passenger vehicles, industrial, agricultural and marine engines are generators and engine starters, a control relay switch for starting marine and heavy industrial engines, batteries, lamps and the new "T2" type direction indicator for passenger and transport vehicles.

C.S.A. Batteries, Ltd., Wharf Street, Warwick. **B.313/212.**—Unit kitchen equipment covers cooking, refrigeration, water heating, etc.

Cable Makers' Association, 52-54, High Holborn, London, W.C.1. **C.413/312.**—Cables and accessories.

Cable & Wireless, Ltd., Electra House, Victoria Embankment, London, W.C.2 **C.106.**—The Post Office teleprinter network is demonstrated.

Calorizing Corporation of Gt. Britain, Ltd., 34, Farringdon Street, London E.C.4. **D.407/306.**—Air heater tubes, "Cannet" heat-resisting alloy steel superheater supports, etc.

Cambridge Instrument Co., Ltd., 13, Grosvenor Place, London, S.W.1. **D.758.**—A comprehensive exhibit covers instruments for the measurement of temperature humidity, CO_2, draught and pressure, and

pH. New surface pyrometer and thermometer regulators (illus. below) are also shown, with examples of thermometers specifically designed for particular uses, e.g., varnish manufacture, molten metals, dough testing, and jam boiling. A workshop potentiometer for checking thermo-electric pyrometer outfits is fitted with a self-contained potential source which enables an indicator to be deflected to any desired point on its scale.

Camley Engineering Co., Ltd., Moortown, Leeds. **C.315.**—In addition to frozen food cabinets, the "Drincolator" the "Dr.7" 7 cu ft automatic carbonated drink dispenser, a domestic refrigerator and the "Neptune" fish cabinet, there is a type of cabinet new to this country.

Campbell Engineering Co., Ltd., Sherman Works, Bromley, Kent. **A.326.**—The 4 kW "Hotway" rapid water heater gives a pint of boiling water every 48 sec and a gallon of hot water (125-130 deg F) every 3 min. Immersion heaters are also shown.

W. Canning & Co., Ltd., Great Hampton Street, Birmingham, 18. **D.207/106.**—Items of special interest are a fully automatic electro-plating plant, a new automatic chrome barrel, a vertical idler backstand, a continuous automatic polishing machine, and a triangulated centreless banding machine. Other exhibits are dynamos, "Canning-Westalite" rectifiers and resistance boards.

Capon Heaton & Co., Ltd., Hazelwell Mills, Birmingham, 30. **D.712.**—Examples of mouldings, extrusions and bondings.

Tom Carrington & Co., Ltd., Stony Lane, West Bromwich. **D.622.**—Power pipe screwing and cutting off machines are additions to the range of "Lyndon" and "Ega-Kut" tools.

C.W.S. "Dudley" hair-dryer

Cambridge thermometer regulator

Carter & Co. (Nelson), Ltd., William St., Nelson, Lancs. **C.203.**—Fire alarm apparatus and switchboards, hand lamp transformers, unit heaters, fans, sirens and control gear.

Carter Gears, Ltd., Thornbury Road, Bradford. **D.532.**—Hydraulic infinitely variable speed gears.

Chance Brothers, Ltd., Smethwick. **C.622.**—The "Square Beam" airport location beacon (illustrated) shown for the first time has a luminous range up to 60 miles under clear weather conditions.

Chloride Batteries, Ltd., Clifton Junction, near Manchester. **C.717.**—Chloride and "Exide" batteries range from large stationary traction cells to small accumulators. A typical "Keepalite" automatic emergency lighting set comprises a charging and control cubicle and sealed-in glass cells on a double tier stand.

Christy & Norris, Ltd., Chelmsford. **D.403.**—With the well-known "Essex" hammer mill, a 3 h.p. automatic unit, are examples of disintegrators, pulverizers, "Briton" grinders, and laboratory mills.

Clang, Ltd., Crown Yard, London, N.W.2. **C.215.**—Plastic moulded electrical accessories and zinc alloy diecast conduit fittings include new shuttered sockets, switch-fuses, mutiplugs, clock connectors, ceiling roses, appliance connectors, lampholders and battenholders. In addition with the installation of a Ceramic Department the company is producing porcelain reel insulators, connectors, cleats and semi-recessed and standard ceiling roses. Plugs and sockets embody porcelain interiors for certain sizes.

Clarkson Thimble Tube Boiler Co., Ltd., 15, Fetter Lane, London, E.C.4. **D.407/306.**—Boilers for waste heat recovery are of special interest.

George Cohen, Sons & Co., Ltd., Wood Lane, London, W.12. **Outdoor 1334 and 1327/1226.**—Products of the "600" Group include sheet metal and wood working machinery, "Sintrex" iron powders, a 5 ton shunting crane fitted with an electromagnet, Browett Lindley steam and petrol engines and air compressors.

E. K. Cole, Ltd., Southend-on-Sea. **C.403.**—See Ekco-Ensign Electric, Ltd.

Coleman & Appleby, Ltd., Constitution Hill, Birmingham, 19. **D.211.**—The main exhibit is a "Canda" semi-automatic plating unit. Other items are meter panels, resistance boards, plating chemicals, anodes and polishing compositions.

J. Collis & Sons, Ltd., Regent Square, London, W.C.1. **D.623/522.**—By driving certain of the rollers the "RolaVeyor" roller conveyor can now negotiate gradients wherever necessary without the aid of any other form of hoist. It is seen coupled up with the "MotaVeyor" portable belt conveyor. A new telescopic model of the Collis stacker works under low headroom.

Columbus, Ltd., Capitol Works, Empire Way, Wembley. **C.721.**—The "Columbus" combined suction floor polisher and vacuum cleaner, pressure wax sprayers, power squeegees and "Dixon" floor scrubbing, polishing and carpet shampooing machines.

Concentric Manufacturing Co., Ltd., Tyburn Road, Birmingham, 24. **D.251.**—In addition to the "Streamline" automatic pie and tart moulding and filling machines with an output of 1,900 per hour with only one operator, there are shown for the first time the "Lofstrand" glass washing and sterilizing machines dealing with 1,600 glasses an hour dried ready for immediate use, and a cutlery washing and sterilizing machine (2,000 an hour).

Concordia Electric Wire & Cable Co., Ltd., Long Eaton. **C.706.**—Wires and cables with all insulations, resistance wires, cord assemblies, insulating varnishes, etc.

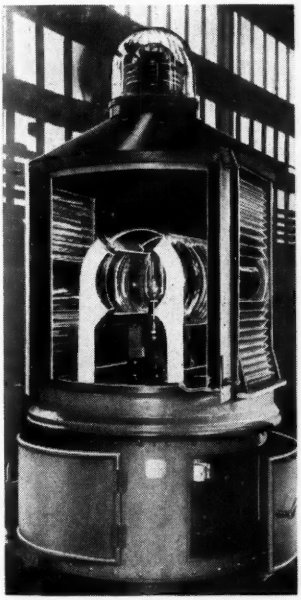
Connollys (Blackley), Ltd., Manchester, 9. **C.413/312.**—Wire-drawing and silk covering machines demonstrate the production of winding wires. An abrasion resistance tester is seen checking the toughness of synthetic enamel films on wires.

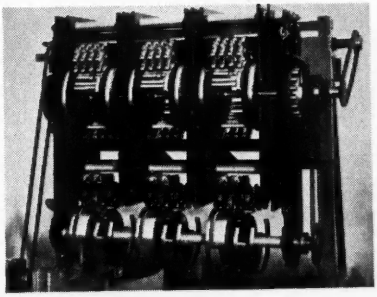
Consolidated Pneumatic Tool Co., Ltd., 232, Dawes Road, London, S.W.6. **Outdoor 1310.**—Portable air compressors comprise six models from 63 cu ft to 500 cu ft capacities. The Class TB stationary, horizontal type air compressors are new.

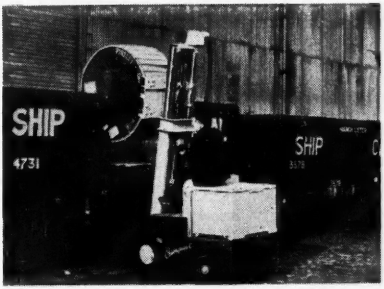
Constructors, Ltd., Tyburn Rd., Birmingham, 24. **D.401/300.**—Steel racks, bins, shelving, etc.

Co-operative Wholesale Society, Ltd., Hall Street, Dudley. **B.711/620.**—The latest production among a display of vacuum cleaners, fires, washing machines and irons is a hairdryer (illustrated) of distinctive appearance with a white streamlined plastic body and dark brown handle.

Left: Chance square-beam airport location beacon. Right: Crompton Parkinson-B.E.T. on-load tap changer. Below: "Conveyancer" handling cables (Electro-Hydraulics)







Included with table lamps and floor standards are new fluorescent lighting fittings.

Copper Development Association, Kendals Hill, Radlett. **D.230.**—Attention is drawn to the technical services offered free by the Association.

Craigpark Electric Cable Co., Ltd., Flemington St., Springburn, Glasgow, N. **C.413/312.**—Electric cables and accessories.

Crane, Ltd., 45, Leman Street, London, E.1. **D.611.**—Valves, pipe fittings, etc.

Crofts (Engineers), Ltd., Thornbury, Bradford. **D.532.**—The new "Ritespeed" geared motor has a range of up to sixty output speeds. Variable speed gears and pulleys, a stoker drive gear box, and other gear units are seen in operation.

Crompton Parkinson, Ltd., Crompton House, Aldwych, London, W.C.2. **D.609 and C.413/312.**—Electrical machines are represented by a 50 kW d.c. generator, a 15 kW alternator, standard induction motors and "Minor" f.h.p. motors. A ceiling fan has a capacitor winding with a condenser permanently in circuit ensuring a power factor approaching unity. "ALA" switchgear for up to 250 MVA breaking capacity at 11 kV and normal current 600 A, has side-blast baffle arc-control devices, and vertical isolation. Type MDA on-load transformer tap-changing switch (illus. p. 867) made in association with the British Electric Transformer Co., Ltd., incorporates mercury switches that serve as arcing contacts to make and break the transfer circuit current and thereby eliminate burning of the main metal contacts and deterioration of the oil. Also on view are "Nelson" stud welding equipment, "Tong-Test" ammeters, switchboard and portable instruments, house service meters, cables, fluorescent lighting fittings and a Young armoured positive-plate battery.

R. Cruickshank, Ltd., Camden Street, Birmingham, 1. **D.224.**—New items are a compact filter press, mounted on runners, for use with all types of plating solution, a new centreless polishing machine, submerged barrel burnishing equipment, an immersed plating barrel for bright nickel solution and a straight line automatic polishing machine. Polishing lathes, centrifuges, mops, polishing compositions, salts and plating accessories are also represented.

Cyc-Arc, Ltd., 27, New North Road, London, N.1. **C.218.**—Standard equipment efficiently welds aluminium alloy studs and fittings. Equipments are especially designed for easy handling and reliable service under rigorous conditions and for high speed repetition work. An outstanding feature is the controller incorporating the patented pilot-arc system enabling welding to be successfully carried out despite the presence of moderate coatings of rust or paint.

D.P. Battery Co., Ltd., Bakewell. **C.711.**—Batteries for lighting plants, power stations, telephone exchanges, from 10 to 73,000 Ah capacity; "Kathanode" traction batteries for electric trucks, locomotives, ships and submarines.

T. H. & J. Daniels, Ltd., Stroud, Glos. **D.310.**—A 75/12-ton downstroke transfer plastics moulding press is equipped with electrically heated platens 18in square. The "2B" preforming machine deals with the difficult grades of moulding powders which require higher pressure and are awkward to feed. The "Timemaster" developed for use with moulding presses is such that once set the moulding cycle, including one or two "breathes," is identical in every case.

Edwin Danks & Co. (Oldbury), Ltd., Oldbury. **D.407/306.**—Boilers and chain grate stokers.

A. D. Davidson Electric Co., 62, Granville Street, Birmingham, 1. **C.726.**—"Davey" appliances include irons, toasters, boiling rings, fires, kettles, coffee percolators, coffee sets and hot water jugs.

Davis Sheet Metal Engineering Co., Ltd., 54, Islington Park Street, London, N.1. **C.105.**—Cable trunking is displayed with the new "Quick-Fix" covers. Overhead, vertical riser and horizontal busbar systems are also represented, as well as trough reflectors for tungsten or fluorescent lamps.

Davis & Timmins, Ltd., Billet Road, London, E.17. **C.316.**—Terminals, cable sockets, connectors, conduit bushes, repetition parts, inserts for plastics, etc.

Thomas de la Rue & Co., Ltd., 84-86, Regent Street, London, W.1. **D.612.**—"Traffolyte" plastic engraved or printed signs, dials, etc.; "Delaflex" insulated sleevings; "Hamofil" connecting wires for radio and electronic circuits; "Delaron" laminated plastic board, etc.

G. P. Dennis, Ltd., Fleming Road, Speke, Liverpool. **C.610.**—A complete range of switch-fuses, switch splitters, distribution boards incorporating both rewirable and h.r.c. fuses from 15 A to 400 A is offered. With consumer units are new cooker control units, including the new flat pin fused plug and socket outlets. H.r.c. cartridges are available for up to 800 A capacity. They are all A.S.T.A. certified for categories AC4 and AC5 and are competitive in price. A new range of industrial oil immersed circuit breakers up to 600 A are A.S.T.A. tested to 25 MVA at 440 V. A medium voltage substation switchboard is also on show.

Desoutter Brothers, Ltd., The Hyde, London, N.W.9. **C.415.**—Electric tools include the new $\frac{1}{4}$in and $\frac{5}{16}$in capacity drill guns with speeds from 450 to 5,000 r.p.m.,

and screw guns and nutrunners for up to No. 14 wood screws or $\frac{5}{16}$in nuts. All these tools have motors with 10 per cent more power than previous models, and all screw guns and nutrunners can be fitted with reversing switches. Bench clamps and drill stands are available for all models. Drills with capacities up to $\frac{7}{8}$in and a new 6in grinder are also shown. Pneumatic tools include miniature high-speed drills.

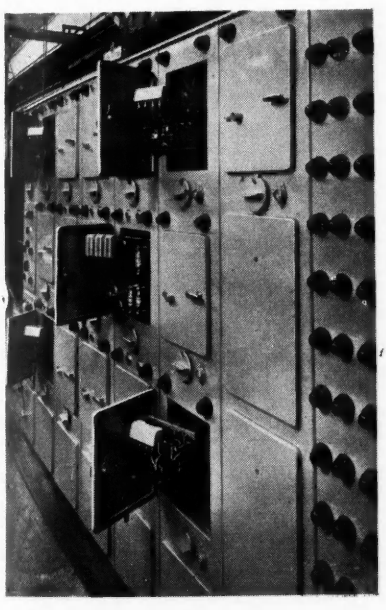
Dexion, Ltd., 34, Fouberts Place, London, W.1. **B.306a.**—Dexion slotted angle can be used for constructing work benches, building frameworks, electrical switchgear mounting, storage racks, etc.

Diamond Motors (Wolverhampton), Ltd., Upper Villiers Street, Wolverhampton. **C.229.**—Industrial type Graiseley pedestrian controlled electric vehicles can be fitted with special bodies to meet all requirements.

R. G. Dixon & Co., Ltd., Capitol Works, Wembley. **C.721.**—See Columbus,, Ltd.

Donovan Electrical Co., Ltd., 70-82, Granville Street, Birmingham, 1. **C.110.**—A.c. direct-switching starters, both reversing and non-reversing, with and without isolator, in four sizes covering up to 50 h.p., are shown, together with examples of automatic star-delta starters, slip-ring starters, larger contactors, and a short length of a modern type of grouped motor control switchboard (illustrated). Additional exhibits cover control accessories, such as limit switches, pushbuttons, float switches and relays; "Donlok," "Safuse" and "Scrutact" heavy-duty ironclad switch-fuse gear (semi-enclosed rewirable and h.r.c. patterns), and fuseboards; industrial type switch-sockets and plugs for up to 100 A; and an overhead busbar system of a new enclosed pattern, with a movable brush carriage for feeding portable tools and electric hoist blocks.

Donovan grouped motor control switchboard



Doulton & Co., Ltd., Albert Embankment, London, S.E.1. **D.743/642.**—Porcelain insulators are supplied for overhead power lines up to 11 kV working voltage (excluding disc insulators), switchgear, transformers, indoor and outdoor substations up to 33 kV, telecommunications, telephone, telegraph, radio, traction, electric railways and trolley buses; also insulators up to 36in high and 14in diameter.

Dunlop Rubber Co., Ltd., Cambridge St., Manchester. **D.621/520.**—Ebonites, rollers, belting and rubber products.

Dunlop Special Products, Ltd., Birmingham, 24. **D.621/520.**—Flexible couplings, anti-vibration mountings, etc.

E.M.B. Co., Ltd., West Bromwich. **D.238.**—No. 9 cold chamber machine for aluminium die castings up to $3\frac{1}{2}$ lb is accompanied by the new No. 9B injection moulding machine which is powered by compressed air under hydraulic control and has an electrically heated plasticizing cylinder.

Edison Swan Electric Co., Ltd., 155, Charing Cross Road, London, W.C.2. **C.413/312.**—Electric cables and accessories.

F. J. Edwards, Ltd., 259-361, Euston Road, London, N.W.1. **D.411.**—Eight new "Besco" machines exhibited include guillotines, a nibble-shearing machine, a production bar cropper, an open fronted vertical section rolling machine, a semi-automatic side seaming machine, and a universal rotary combination machine.

Ega Electric, Ltd., Holyhead Road, Wednesbury. **C.116.**—Products include malleable conduit fittings; "Egatube" non-metallic conduit tube and fittings; light switchgear; plug-in direct-on and star-delta starters and reversing contactors; and the "Egaspray" all-electric airless spray gun.

Ekco-Ensign Electric, Ltd., Southend-on-Sea. **C.403.**—Lighting products include high wattage and special tungsten lamps, fluorescent lamps in many colours, industrial and domestic fittings (illus. p. 870), special decorative and shop lighting display fittings, with control gear and accessories. Besides "Thermovent" convectors and "Thermotubes" of domestic, marine and industrial types, a new high temperature

Ekco-Ensign decorative lighting fitting

radiant panel heater is shown. Plastic mouldings are also represented.

Electric Construction Co., Ltd., Wolverhampton. **C.708.**—An electronically controlled "Varispeed" drive for a sizing machine used extensively in the textile industry is of particular interest. Motors shown range from 1 b.h.p. squirrel cage up to 25 b.h.p. blowover slip-ring types, while switchgear includes a 200 A, 600 V drawout type oil circuit breaker arranged for wall mounting, a 7½ b.h.p. contactor type direct-on starter, a 600 A double-pole, air-break circuit breaker, and 60 A and 30 A triple-pole and double-pole ironclad switches and fuses with h.r.c. fuses. An induction regulator giving smooth control of an a.c. supply over any desired voltage range is of the single-phase, hand-operated type having a control capacity of 2 kVA. An oil-immersed selenium metal rectifier to be used in the new plant of the Steel Company of Wales at Trostre is shown.

Electric Furnace Co., Ltd., 161, Queens Road, Weybridge. **C.611.**—The whole of this stand has been allocated to the associated companies, the Electric Resistance Furnace Co., Ltd., and the Electro-Chemical Engineering Co., Ltd., dealt with below.

Electric & Ordnance Accessories Co., Ltd., Havelock & Shelton Potteries, Hanley, Stoke-on-Trent. **C.212.**—Die pressed porcelain ceiling roses, connectors and accessories.

Electric Resistance Furnace Co., Ltd., 161, Queens Road, Weybridge. **C.611.**—Equipment demonstrated for the bright hardening of small parts has its hearth designed to drop parts into the quench without the use of a scraper or other device, thus ensuring quenching out at full temperature with resulting uniform hardness. Bright work free from carburization and decarburization is obtained by the incorporation of the "Efco" atmosphere generator of the endothermic type.

Electric Transmission, Ltd., Etruria, Stoke-on-Trent. **C.212.**—Transmission line accessories, including clamps; h.r.c. "Eetee" fuses; indoor and outdoor air-break switchgear; and outdoor transformer bushings.

Electrical Engineering Construction Co., Ltd., Seymour Wharf, Totnes. **C.740.**—Diesel-engined alternator power and lighting plants from 3 kVA to 1,000 kVA.

Electrical Review, Dorset House, Stamford Street, London, S.E.1. **C.614.**—This stand will serve as an inquiry bureau at which representatives of all departments of the journal will be available to give information on all aspects of the industry.

Electro-Chemical Engineering Co., Ltd., 161, Queens Road, Weybridge. **C.611.**—Two types of "Efco-Udylite" fully immersed horizontal plating barrel are made, one for acid and one for alkaline plating. They are particularly suitable for use with "Efco-Udylite" bright nickel when thicknesses of up to 0.0005 in can be deposited in 60 min. The barrel cylinders are made in three sizes, the capacity being up to 100 lb. A storage and transfer unit for barrel plating is also shown.

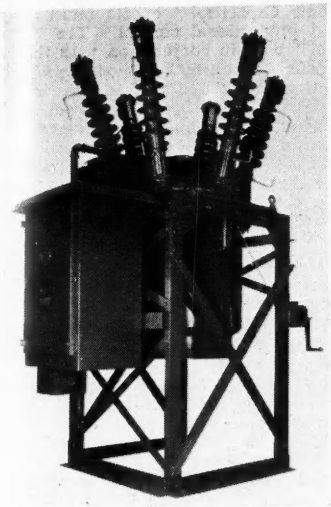
Electro-Hydraulics, Ltd., Liverpool Road, Warrington. **D.717/616 and Outdoor 1358.**—Three new features of "Conveyancer" fork lift trucks (illus. p. 867) are a "free-lift," a device for picking up materials without pallets and a hydraulic shovel attachment.

Electrolux, Ltd., 153-5, Regent Street, London, W.1. **C.738.**—The L.T.700 refrigerator (7.1 cu ft) (illustrated) is intended for the larger household. Special features are an ice freezing compartment with space for storing frozen foods; a hydrator drawer and wire baskets; glass dishes for butter, etc., to prevent absorption of odours from other foods; and a lockable door handle.

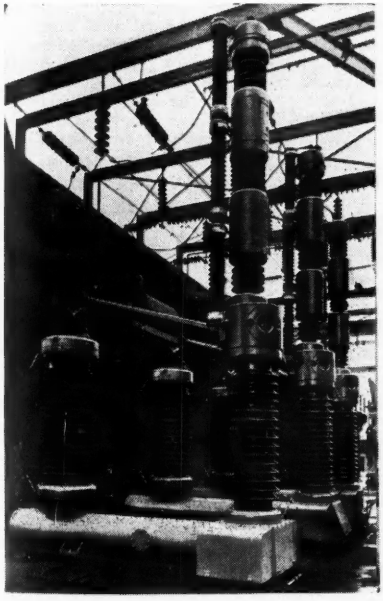
Electromagnets, Ltd., 1, Bond Street, Birmingham, 19. **C.605.**—Lifting magnets, electromagnetic and permanent magnetic separators, magnetic clutches, holding-down magnets, magnetic pulleys and drums, overband separators, permanent magnets, spout magnets, ore separators and equipment for ceramic industries.

Electro Mechanical Manufacturing Co., Ltd., Marlborough Street, Scarborough. **C.231.**—Unit type "Y" industrial metal-clad switchgear for up to 660 V can be supplied for use under severe atmospheric conditions and is available for outdoor use even in tropical climates.

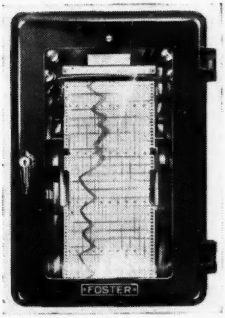
Electro Methods, Ltd., 220, The Vale, London, N.W.11. **C.734.**—Industrial electrical controls, adjustable contact thermometers, humidity controls, thermostats, relays, earth protection equipment, earth testing units, magnetic amplifiers, magnetic photometers, mercury switches, flexible heaters and resistances, and water stills. Of special interest are control devices employing magnetic amplification; a low inertia, low power motor for use with servo controllers and new earth continuity testers.



Ferguson Pailin 66 kV oil circuit breaker and (below) English Electric 165 kV, 3,500 MVA air blast circuit breaker

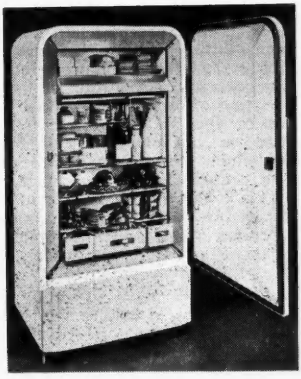


Above: Fenner variable speed drive



Right: Foster multi-point temperature recorder

Electrolux L.T.700 refrigerator



Elliott Brothers (London), Ltd., Century Works, London, S.E.13. **C.320.**—The new "Elliottronic" potentiometer recorder, using a magnetic invertor, is of unit construction, while the "Elliottrol" trimode automatic process control system is on the forced-balance system. Applications of magnetic amplifiers demonstrated include a lighting controller and automatic temperature control of a furnace. A new system of traction speed indication employs a multiple a.c. generator direct coupled to the axle, rectifier indicators and recorders. Other exhibits are new circular chart, flow and pressure recorders; thermal conductivity gas analysers for flue gases and food storage; Elliott-Shotter remote indication and control instruments; a new high-speed radiation pyrometer for steel mills; an optical pyrometer now available with alternative ranges 800-2,200 deg C and 800-1,700 deg C; electrical measuring instruments; a new low-power-factor watt meter; and the "Weameter" portable test set.

Enfield Cables, Ltd., Victoria House, Southampton Row, London, W.C.1. **C.413/312.**—Electric cables and accessories.

English Electric Co., Ltd., Queens House, Kingsway, London, W.C.2. **C.613/512.**—Switchgear products range from a 165 kV airblast circuit breaker rated at 3,500 MVA r.c. (illus. p. 871) down to 3.3 kV air circuit breakers for industrial use. Simplification is the keynote of design of a range of ten sizes of pole-mounting transformers typified by a 100 kVA, three-phase, platform mounting unit. Small transformers are to be seen equipped with standard "C-type" cores. A mobile mining type transformer (150 kVA) may be fitted with a combination of terminal arrangements. Ignitrons, in two sizes, have special application in regard to the control of resistance welders, but may be applied to the precision switching of a.c. for any purpose. Exhibits of the Fusegear Department again indicate the tendency towards simplification and standardization. Overhead busbar equipment is demonstrated in the form of a short complete section of busbar. Since last year a television receiver and a food mixer have been added to the company's domestic appliances, which also include a 6.4 cu ft refrigerator, cookers, washing machines, fires and a plate-warmer. A high-frequency induction heater, a portable insulation tester, a process timer, and electronic and magnetic amplifier motor controllers are new industrial electronic products.

Ether Ltd., Tyburn Road, Birmingham, 24. **C.700.**—Recent developments relate particularly to the automatic control of temperature, etc. The Ether-Wheelco range of electronically operated temperature controllers is exhibited. The "Capacitrol" gives single-position control and the "Multronic Capacitrol" effects multi-position and proportional control. The "Throttltrol" used in conjunction with the "Multronic Capacitrol" provides proportional control of gas- and oil-fired apparatus. The Ether-Gordon "Xactline" anticipatory control device eliminates "hunting" in a control variable due to thermal capacity and provides straight-line temperature from the most refractory furnace. Other items are the "Flame-otrol" combustion safeguard air and gas pressure switches, gas and air valves, pyrometers, etc.

Excelall Metal Workers, Ltd., Sampson Road North, Birmingham, 11. **A.318.**—Copper cable sockets and cold metal pressings for the domestic electrical trade.

Falk, Stadelmann & Co., Ltd., 91, Farringdon Road, London, E.C.1. **C.419.**—New industrial switch boxes have black enamel cast-iron boxes with rounded corners and streamlined protected dolly plates. The same box is available for surface or sunk work in 1, 2, 3, 4 and 6 gang, and an adjustable grid allows each switch to be correctly aligned according to the depth of plaster. Besides "Morgan" weatherproof floodlights, there are three new commercial fluorescent fittings incorporating fluted clear "Perspex" diffusing screens. Among domestic appliances are reflector fires, breakfast cookers, vacuum cleaners, irons (streamlined, thermostatic and "Gad-about"), the "Auto-Perc" coffee maker, "Cleanline" kettles (including a new 6 pint model), the new "Auto-Maid" floor polisher, a new plate-warmer, immersion heaters and circulators.

Felco Hoists, Ltd., 17, Victoria Street, London, S.W.1. **D.128.**—Electric hoists.

J. H. Fenner & Co., Ltd., Marfleet, Hull. **D.404.**—Special attention is drawn to a variable speed drive (illus. p. 871), incorporating the "Hainsworth" variable speed belt. The Mark 5 V-belt and a fractional h.p. pulley are other new items.

Ferguson, Pailin, Ltd., Higher Openshaw, Manchester, 11. **C.617.**—Switchgear for indoor and outdoor service ranges from 11 kV air insulated metalclad indoor gear for secondary distribution network substations to 66 kV outdoor circuit breakers for use on main transmission lines and primary distribution systems. An outdoor 66 kV type ROP.54 oil circuit breaker (illus. p. 871) specially developed for the export market and incorporating arc control devices enabling currents up to 750 MVA at 66 kV to be interrupted, is arranged for demonstration of auto-reclosure. A 220 kV hand-operated rotating post isolator has been developed for use at testing stations.

Ferranti, Ltd., Hollinwood, Lancs. **C.615/514.**—Among transformers is a new ¼ kVA pole mounting unit of sealed construction, with one point fixing, provided with solderless clamped type terminals, ensuring ease of installation and exceptionally low maintenance costs. A new house service meter, type FM, designed to comply with the requirements of the largest number of world specifications, makes use of the latest magnetic materials and the newest techniques. Instruments include a new portable viscometer and the Ferranti "Servopack." Of special interest is a demonstration of phasing equipment. Items of electronic equipment are an Admiralty echo-sounding set, stroboscopic lamps and a sectional model of a 12in flat-faced industrial cathode ray tube. Water heaters, fires, clocks and products of the Ferranti Foundry complete the display.

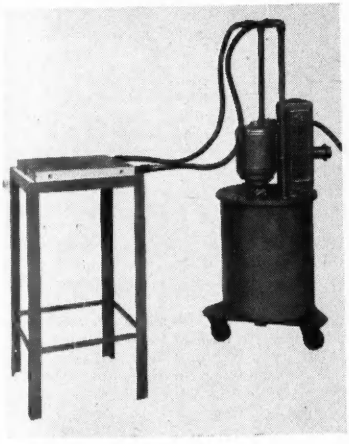
Ferro Enamels, Ltd., Womburn, Wolverhampton. **B.515.**—Pottery furnaces and materials.

Fescol, Ltd., North Road, London, N.7. **D.652.**—Examples of electro-chemical deposition work cover the treatment of new parts for the prevention of corrosion and/or wear, and the salvage of worn or incorrectly machined components.

Fibreglass, Ltd., Ravenhead, St. Helens. **D.312.**—Working models demonstrate the uses of "Fibreglass" heat insulation. A boiler in the centre has a district heating scheme on one side and an overhead steam system on the other, the latter feeding a turbine and then passing out to process work and factory heating.

Finney Presses, Ltd., Berkeley Street, Birmingham, 1. **D.243.**—A self-contained heat circulating unit (illustrated) for serving the automatic heat control of moulds or platens can be used either with oil (70 deg to 350 deg F) or water (70 deg to 200 deg. F) as the medium. The 6 kW immersion heater is thermostatically controlled. The pump unit (8-12 gall per min capacity at 15ft-5ft head) is operated by ⅓ h.p. motor. The unit, complete with starter and flexible metallic hose for connecting to moulds, is mounted on a wheeled base. Exhibits also include a 50 ton dual transfer press, a 10 ton laboratory press, and the latest solenoid-operated valve.

Finney automatic oil circulating unit



Firth Brown Tools, Ltd., Carlisle Street, Sheffield, 4. **D.627.**—A range of tools.

Firth Vickers Stainless Steels, Ltd., Staybrite Works, Sheffield. **D.419/320.**—Stainless and heat-resisting steels.

H. Fisher (Oldham), Ltd., Glodwick Road, Oldham. **C.703.**—Three types of washing machines are now available, the standard Fisher washer (7 lb of dry clothes) with a power-driven wringer; the "De Luxe" model (9 lb) with electric pump, water heater and a new master switch control providing additional safety during operation; and the low-priced "Washette" with no wringer.

Fisher & Ludlow, Ltd., Kingsbury Road, Birmingham, 24. **D.303.**—The Bendix automatic home laundry.

Fitzgibbon & Murray, Ltd., The Lower Mill, Kingston Road, Ewell. **C.105.**—A new range of surface and sunk type all-metal domestic bell pushes is available in stainless steel. Torpedo switches, lampholders, plugs, etc., are also shown.

Flextol Engineering Co., Ltd., The Green, Ealing. **D.231.**—Flexible shaft-driven tools.

Foster Instrument Co., Ltd., Letchworth. **C.727.**—Equipment for the measurement and control of temperatures from sub-zero to the highest encountered in industry or research include multi-point indicators up to 90 points, automatic temperature controllers with mechanically operated control contacts, a potentiometric programme controller for controlling to a preset time/temperature programme cycle, a new electronically actuated controller, a multi-point temperature recorder (illus. p. 871), a "Teloscale" illuminated temperature indicator, readable from distances of 40ft or more, and several new "Introscopes" for examining hollow and inaccessible parts.

Foster, Yates & Thom, Ltd., Blackburn. **D.504.**—The design of the No. 2 transportable mixing machine ensures accurate and consistent mixing without regard to the proportions, grain size or specific gravities of the ingredients.

Fractional H.P. Motors, Ltd., Rookery Way, London, N.W.9. **C.712.**—Small electric motors, include series, shunt, single phase, two or three phase, shaded pole, capacitor and synchronous types and geared units (illustrated) up to ⅛ h.p. from 2 lb/in torque to 600 lb/in torque, with final speeds from 1 r.p.m. to 240 r.p.m.

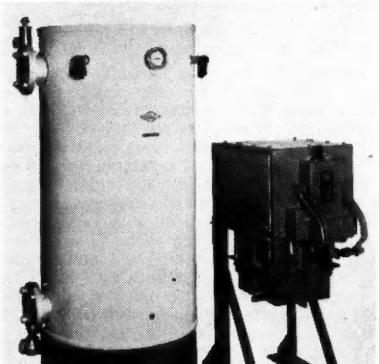
W. T. French & Son, Ltd., Mysto Works, Browning Street, Birmingham, 16. **A.433.**—The latest "Mysto" electrical appliances include irons, toasters, car heaters, boiling plates, fires, kettles, coffee percolators, hot-water jugs, tea urns and soldering irons.

R. J. Fullwood & Bland, Ltd., Victoria Street, Ellesmere. **A.224.**—Bucket-type milking machines of both portable and midget types can be seen. The Fullwood "Recorder Releaser" is available in both abreast and tandem types.

Funditor, Ltd., 3, Woodbridge Street, London, E.C.1. **D.330.**—The new "Sand-Jet" marking machine not only marks materials such as hardened steel, glass, ceramics, plastics, etc., but also delicate thin-walled parts, including radio valves.

G.W.B. Electric Furnaces, Ltd., Dibdale Works, Dudley, Worcs. **C.321/220.**—"Autolec" electrode boilers (illustrated) comprise a 30 kW continuous steam raiser, a 70 kW continuous steam raiser, a static model steam raiser of 20 kW rating, a 100 kW fully automatic hot-water boiler, and a hand-operated water boiler. Samples of "Eternite" case-hardening compound are also included, and there is a working model of a K.L. carburizing compound controller. Furnace photographs include views of "flash annealing" equipment for light alloys, and two 70 ton semi-continuous aluminium slab-heating furnaces.

G.W.B. 450 kW automatic water boiler



Gascoignes (Reading), Ltd., Reading. **D.614.**—Milking machines and other dairy farming equipment.

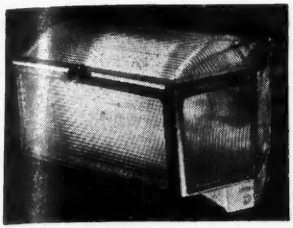
General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2. **C.503/402.**—Working examples of the lighting units shown in a scale model of an airport are displayed with a selection of optical glassware for airport lighting. To illustrate the application of its research facilities to the production of street-lighting equipment, the company shows stages in the evolution of a street-lighting lantern, actual street lanterns displayed including the "Three-Eighty" refractor lantern for three 80 W fluorescent tubes; the new post-top mounting lantern; a totally enclosed sodium lantern; a "Viatron" lantern (illustrated) for trunk road lighting, and a "Dioptrion," or double-dish lantern. Completing the exhibit is a display of motors for the textile industry; steelworks motors; a.c. and d.c. industrial motors; motor starters; and electronic equipment for motor control.

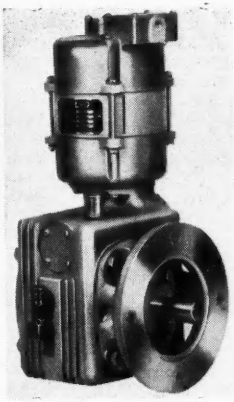
Gent & Co., Ltd., Faraday Works, Leicester. **C.407.**—All clocks throughout the Fair will be controlled by a master clock of a controlled electric clock system, incorporating a large tower clock. Other working exhibits are marine and watchman's clock systems, fire and burglar alarms, mine signalling equipment, luminous call and staff locator systems, an audible liquid level indicator/recorder unit, floatless control for electric pumps, bells and indicators. Industrial process timers, sirens, telephones, synchronous electric clocks and liquid level control equipment are also represented.

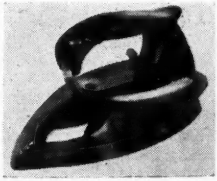
Edward Gill, 52/54, Hylton Street, Birmingham, 18. **A.648.** — Electric fires, elements, etc.

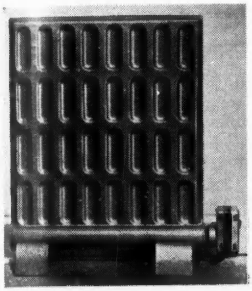
Gillott Electro-Steam Cookers, Ltd., Cotswold Works, Chalford, Near Stroud, Glos. **C.416.**—To meet the needs of households which require cooking, steaming and boiling water services without provision for domestic hot water, a new cooker similar in appearance to the previous Gillott unit has been designed comprising a hob with an 8in radiant plate with a "Simmerstat," a 10in by 8in grill and two steaming wells. Boiling water is available at the rate of about three pints every three minutes. In addition to a 13in by 13in by 15in oven with thermostatically controlled side and bottom heating there is a simmering oven or hotcupboard of similar size suitable for fruit bottling and slow-process cooking.

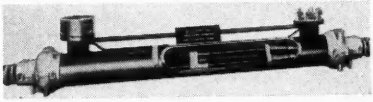
F. Gilman (B.S.T.), Ltd., 195, High











(1) G.E.C. "Viatron" lantern. (2) Motor with treble worm gear (Fractional H.P. Motors), Ltd. (3) L. G. Hawkins iron. (4) Habin "Dimplex" radiator. (5) 66 kV joint for Henley screened gas cushioned cable

Street, Smethwick, 41. **D.506.**—In addition to "Skatoskalo" boiler scaling machines, there are "Multiflex" portable machines for grinding, polishing, etc.

D. Gilson & Co., Ltd., Billet Road, London, E.17. **C.309.**—Terminals, cable sockets, connectors, conduit bushes, machine repetition parts, inserts for plastics, etc.

Girdlestone Pumps, Ltd., 23, Davies Street, London, W.1. **D.333.**—Besides centrifugal, vertical spindle and diaphragm pumps, "Motorpumps" and hot-water circulators, there are two types of float switches, a gravity fall mercury type single-pole switch with topple-over action, and a spring-loaded silver contact single-pole type.

Gittings & Hills, Ltd., Salford Street, Birmingham, 6. **B.326.**—Industrial finishes include "Rockhard" synthetic enamels, "Lustreloid" cellulose lacquers, and "Githilac" oil-resisting machinery enamels.

W. T. Glover & Co., Ltd., Manchester, 17. **C.413/312.**—Cables and accessories.

E. Green & Son, Ltd., Wakefield. **D.510.**—For modern electric power stations and large industrial plants in which much higher working pressures have been adopted the "Premier Diamond" horizontal economizer, has integral cast-iron grills. One type is suitable for pressures up to 4,000 lb per sq in. Triple-tube type cast-iron airheaters are used for power stations.

Greengate & Irwell Rubber Co., Ltd., Greengate Works, Manchester, 3. **C.413/312.**—Cables and accessories.

Guest Keen & Nettlefolds (Midlands), Ltd., Heath Street, Birmingham, 18. **B.309/208, B.629/526 and Outdoor 1321/1220.**—Screws, bolts and nuts, telegraph ironwork, stamping, pressings, etc.

Guests Brass Stamping Co., Birmingham, 29. **D.732.**—Hot pressings in brass, copper and non-ferrous alloys.

H.E.C. Compressors & Engines, Ltd., Levis Works, Birmingham, 9. **D.739/638.**—This company specializes in single-stage air-cooled compressors of from 2½ c.f.m. to 16 c.f.m. displacement, in automatic stationary, portable and mobile types.

Habin, Ltd., Dimplex Works, High Street, Totton, Hants. **C.730.**—The range of "Dimplex" oil-filled radiators has been increased. New designs of the ½ kW and 1 kW models (illustrated) are available for both wall or floor mounting and all models are now supplied with a maximum temperature cut-out only, this making them suitable for either a.c. or d.c. A model with a special capsule type sealed maximum temperature cut-out, which is flash, explosive

and waterproof, can be used in paint spraying shops, hospitals and on board ship. The colour range has been extended.

Hague & McKenzie, Ltd., Sloane St., Birmingham, 1. **C.502.**—"Pyramid" aluminium utensils for hotplate cooking include heavy duty models and new domestic grill-frypans, individual pudding steamers and deep fat fryers.

Hailwood & Ackroyd, Ltd., Beacon Works, Morley, Yorks. **C.602.**—Lighting, glassware and fittings.

Hale & Hale (Tipton), Ltd., Dudley Port, Tipton. **D.609/508.**—"Blackheart" malleable castings.

G. A. Harvey & Co. (London), Ltd., Greenwich Metal Works, London, S.E.7. **B.329.**—"Harco" perforated metals, gilled tubes, etc.

L. G. Hawkins & Co., Ltd., 30-35, Drury Lane, London, W.C.2. **C.723.**—A new automatic heat-controlled iron, the "Hawkins-Universal" LGH.1220 (illus. p. 875) is lightweight, fast heating and quick cooling, so ensuring accurate heat control. It is equipped with a convenient on/off switch. Further examples of domestic appliances are hairdryers, kettles, immersion heaters, handlamps, pressure cookers and the "Electric Hostess."

Heenan & Froude, Ltd., Worcester. **D.226.**—New additions to the range of automatic machines are a high-speed wire straightening and cutting machine and a fence staple machine, the latter being provided with a variable speed drive through a "Heenan-Dynamatic" controlled-slip coupling operating on the eddy-current principle. The S.103A automatic strip forming machine, is used extensively for the production of switchgear and radio valve parts, etc. A further exhibit is an automatic chain welding machine.

W. T. Henley's Telegraph Works Co., Ltd., 51-53, Hatton Garden, London, E.C.1. **C.413/312.**—Special emphasis is placed on super-tension cables, which include gas cushion (illus. p. 875), oil-filled and mass impregnated types. Display panels represent various types of wires, cables and flexibles, including metallic flexible armoured cables; overhead line accessories; the Henley earth-leakage circuit breaker and numerous other accessories; distribution equipment, including the new modern pillar; and outdoor items such as inverted type terminal boxes.

Alfred Herbert, Ltd., Coventry. **D.310 and D.319/216.**—A selection of diecasting and plastic moulding machines, measuring equipment and general machine-shop equipment includes an Edgwick type HY injection moulding machine, the new Daniels 75 ton transfer press, the Daniels 2B preforming machine, the Herbert-Reed Prentice 1½Z hot chamber diecasting machine, the Edgwick A.1611 cold chamber diecasting machine, Sigma multi-dimension inspection machines, the Hilger universal projector and the Hilger "Strainviewer." An "Atritor" unit pulverizer for grinding and drying coal, clay, etc., is also shown.

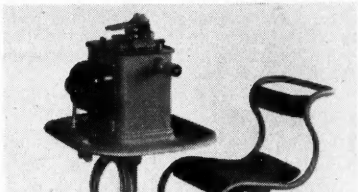
Higgs Motors, Ltd., Birmingham, 6. **C.601.**—Motors and generators for a.c. and d.c. are made in sizes up to 500 h.p. Fractional h.p. motors are of split phase, capacitor start, repulsion induction and d.c. types, while industrial motors include two and three phase motors of the slip-ring and squirrel cage types, screen protected and totally enclosed fan cooled patterns. As an alternative to motors with standard flanges and shafts or special flanges and shafts to suit customers' individual requirements, stator rotor units are available from ¼ h.p. to 25 h.p. A.c. variable speed commutator motors are in demand by the printing, paper making, hosiery, etc. industries.

Hilger & Watts, Ltd., 98, St. Pancras Way, London, N.W.1. **D.319/216.**—Optical measuring instruments.

Hind-Griffiths Furnaces, Ltd., Rolfe St., Smethwick, 40. **D.435.**—Industrial ovens and furnaces.

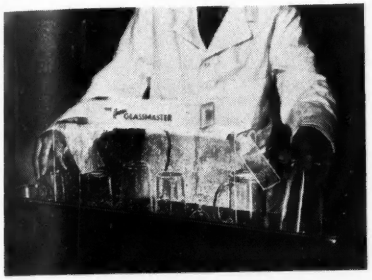
Holden & Hunt, Ltd., Cox's Lane Works, Old Hill, Staffs. **C.719/618.**—Spot welders range from standard foot-operated models in 5, 10, 15, 25 and 40 kVA ratings, to a four-speed motor-driven automatic for single spot or continuous welding. A special 15/30 kVA spot welder fitted with B.T.H. timer is available for welding aluminium up to $\frac{3}{16}$in added thickness. Two No. 1 auto butt wire welding machines (3 kVA) (illustrated) are shown mounted

Holden & Hunt No. 1 butt wire welder



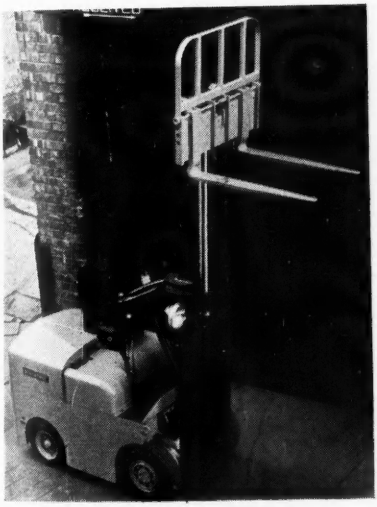
on portable stands complete with operators' seats and work trays. One is fitted with hand-operated cam clamping and the other with special foot-operated spring-loaded clamps for production welding of components of uniform sizes. Three semi-automatic flash butt welding machines of 15, 30 and 45 kW capacity respectively cover sections up to 1½ sq in.

Hoover, Ltd., Perivale. **C.624.** — The new range of fractional h.p. motors incorporates the latest developments to increase efficiency, dependability and range of applications. Demonstrations are given both of the company's washing machine and the "Glassmaster" (illustrated) which washes all types of drinking glasses at the same time.



Hoover "Glassmaster" glass washer

Battery - operated "Stacatruc" (I.T.D.)



E. C. Hopkins, Ltd., Grosvenor St. West, Birmingham, 16. **D.741.**—Flexible shaft machines, grinding and polishing machines and dust extractors.

Hotpoint Electric Appliance Co., Ltd., Crown House, Aldwych, London, W.C.2. **C.513.**—The company's washing machine and portable clothes dryer and airer have been redesigned. The new H.30 refrigerator has a capacity of 4½ cu ft and a storage shelf area of 8.8 sq ft. A glass shelf provides a high humidity compartment at the bottom, and a chiller dish slides on runners underneath the freezer. Other products shown are the "Torribar" kettle, coffee percolator, warming plates, boiling rings, toaster, rotary and table ironers, "Plus-Five" iron, vacuum cleaner, water heaters, fires, table fan and fresh-air damper.

Charles Hufton & Sons, Ltd., Conybere St., Birmingham, 12. **A.324.**—Standard lamps.

I.T.D., Ltd., 142, Sloane Street, London, S.W.1, **Outdoor 1356.**—The new battery - operated "Stacatruc" model 20EH/9 fork truck (illustrated) has a capacity of 1 ton at 24in load centres and a lift of 9ft. Particular attention has been paid to robustness, mechanical efficiency, and the provision of sufficient battery power to last a 10-hour day. Electricar fixed and elevating platform trucks are also represented.

Imperial Chemical Industries, Ltd., 2, Buckingham Gate, London, S.W.1. **D.107. D.309/208, D.315/212 and D.409/308.**—The Plastics Division shows engineering components moulded of nylon, polytetrafluorethylene gland packings, p.v.c. conduits and "Alkathene" film for the protective packaging of instruments, etc. A working laboratory unit shows how the Metals Division employs spectrographic methods for the analytical control of its products, which include sheet, strip, tubes, rod, extrusions and wire, in copper, aluminium and their alloys.

Incandescent Heat Co., Ltd., Cornwall Road, Smethwick. **C.729/626.** — See Metalectric Furnaces, Ltd.

India Rubber, Gutta Percha & Telegraph Works Co., Ltd., Herga House, Vincent Square, London, S.W.1. **D.615.**—"Silvertown" ebonite rod, sheet, tube and mouldings; belting; primary batteries; rubber and gutta percha products.

Ingram Kemp & Joyner, 209, Newtown Row, Birmingham, 6. **D.543.**—Fires and immersion heaters.

International Combustion Co., Ltd., 19, Woburn Place, London, W.C.1. **A.327/226 and D.331/228.**—With a large detail model

of the boiler units now under construction for the Portobello (Edinburgh) station are the new "Dynocone" continuous centrifuge and a "Vacseal Ferloy" metal pump designed to resist abrasive action.

Invicta Electrodes, Ltd., Bilston Lane, Willenhall. **D.717/616.**—Electrodes and welding accessories.

Ioco, Ltd., Netherton Works, Glasgow, W.3. **D.701.**—"Formapex" products include laminated sheets in paper and fabric base qualities; insulation for rail track joints; tubes in round, square and rectangular sections; treated paper for making laminated sheets and tubes; and magnetic slot wedge material for closing gaps in electric motors. "Ocoseal" combining layers of paper or fabric base laminated with intermediate layers of rubber is used for sealing condensers. "Linapex" insulating cloths and tapes and "Silopex" high temperature insulation are other products.

J. P. Engineering Co., Ltd., Meynell Road, Leicester. **A.425.**—The outstanding feature of the J.P. electric lawnmower, which is available in 12in, 14in and 16in sizes, is that it is self-propelled, the motor driving the complete machine and not the cutting cylinder only. For bowling green work a 9-bladed rotary cutter can be fitted.

Jackson Electric Stove Co., Ltd., 143, Sloane Street, London, S.W.1. **C.411/310.**—In addition to domestic cookers and wash boilers there are commercial type cookers; hotcupboards; pastry, steaming and roasting ovens; vegetable boilers; fish fryers, etc.

Jenolite, Ltd., 43, Piazza Chambers, Covent Garden, London, W.C.2. **B.221.**—A working model of a modern de-rusting and rust preventing plant comprises four tanks, a de-greaser, de-scaler, rust proofing and hot rinse tank. Two tanks of normal working size are also demonstrated.

Jenson & Nicholson, Ltd., 36, St. James's Street, London, S.W.1. **B.314.**—A transformer which is working continuously under water shows the complete insulation obtained with the company's solventless insulating varnish. Other varnishes for the electrical industry are to be seen among this company's display of industrial finishes, which include a 30 minute rivelling enamel, "Jensolac" stoving enamels and "Lustalac" polychromatic enamels.

Jicwood, Ltd., Weybridge. **D.726.**—Moulded insulating materials.

Richard Johnson & Nephew, Ltd., Forge Lane, Manchester, 11. **B.417/320.**—Ferrous and non-ferrous wires include transmission wires and steel cored aluminium.

Johnson & Phillips, Ltd., London, S.E.7. **C.413/312.**—The simplicity of the wiping technique for jointing J. & P. aluminium sheathed cables is demonstrated. With seamless aluminium sheathed cables are photographs of installations all over the world.

Kango Electric Hammers, Ltd., Morden Factory Estate, London, S.W.9. **D.720.**—In addition to improved versions of the type "E" (heavy) and spade models, two new electric hammers are shown, the "F" (medium) (illustrated) and "G" (small), weighing respectively 17 lb and 12½ lb.

H. Kaufmann, Ltd., Winton House, St. Andrew Street, London, E.C.4. **A.607/504.**—Irons and vacuum cleaners.

Kenwood Electrics, Ltd., 151, Oxford Street, London, W.1. **C.113.**—The "Electric Chef" food mixer, etc., and the "Kenmix" liquidizer are of special interest. A toaster and an iron are other products.

Cyril Kieft & Co., Ltd., Reliance Works, Derry Street, Wolverhampton. **A.311.**—Immersion heaters, convector heaters and thermostats are products of this company.

Lamson Engineering Co., Ltd., Hythe Road, London, N.W.10. **D.140.**—Industrial cleaners and pneumatic conveyors.

Lan-Bar, Ltd., Semor Works, Seymour Street, Birmingham, 12. **A.525.**—Towel rail.

Langley Alloys, Ltd., Langley, Bucks. **D.210.**—Copper alloys used in electrical engineering include the "Hidurel" range which combines high electrical conductivity with exceptional mechanical strength and hardness. The outstanding mechanical, corrosion and wear resistant properties of "Hidurax" aluminium bronzes are typified by forged end rings for induction motors.

Langley (London), Ltd., 72, Borough High Street, London, S.E.1. **C.226.**—Mica, "Micanite," plastic tubes and stampings, and electrical insulating materials.

Leeds Metal Spinning Co., Ltd., 26, Leeds Bridge, Leeds, 1. **A.523/418.**—Aluminium hollow ware.

Legg (Industries), Ltd., Williamson Street, Wolverhampton. **C.237.**—Air and oil cooled transformers up to 100 kVA, battery chargers, industrial rectifier equipment for switchgear operation and plating, solenoids, d.c. motors, etc.

Ley's Malleable Castings Co., Ltd., Derby. **D.513/410.** — "Black Heart" malleable and "Lepaz Pearlitic" malleable iron castings for the electrical engineering trades.

Lightfoot Refrigeration Co., Ltd., Abbeydale Road, Wembley. **C.114.**—Refrigeration equipment for all purposes.

Liner Concrete Machinery Co., Ltd., P.O. Box 12, Gateshead. **Outdoor 1308.**—Electric vibrators for concreting work and a chain saw sharpener are among the products shown.

Lion Stamping Co., Ltd., 35, Marshgate Lane, London, E.15. **A.205.**—Combined radiators and convectors.

Liverpool Electric Cable Co., Ltd., 24, Queen Anne's Gate, London, S.W.1. **C.413/312 and C.619.**—See London Electric Wire Co., and Smiths, Ltd.

Lockers (Engineers), Ltd., Warrington. **D.502.**—The "Locker-Traylor" drying plant for foodstuffs or fine chemicals incorporates a new electric vibrating dryer. The material to be dried which must be granular is conveyed over a vibrating conveyor deck, through perforations in which air passed over electric strip heaters is blown. An electric vibrating screen and a "Waytrol" constant weight feeder are displayed.

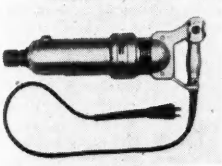
Londex, Ltd., 207, Anerley Road, London, S.E.20. **C.724.**—Emphasis is placed on increasing productivity by the use of automatic controlling, timing, checking and safeguarding of plant and processes. Relays (illus.), timers, photo-electric equipments employing cold cathode valves, "Lectra-level" liquid level control equipment, flow indicators and pressure, vacuum and hopper-level switches, electromagnetic counters, electromagnetic valves for liquids and gases, and thermostats are items shown.

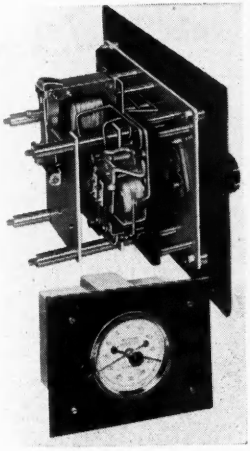
London Aluminium Co., Ltd., Westwood Road, Birmingham, 6. **A.411/312 and D.525.**—Hotplate utensils.

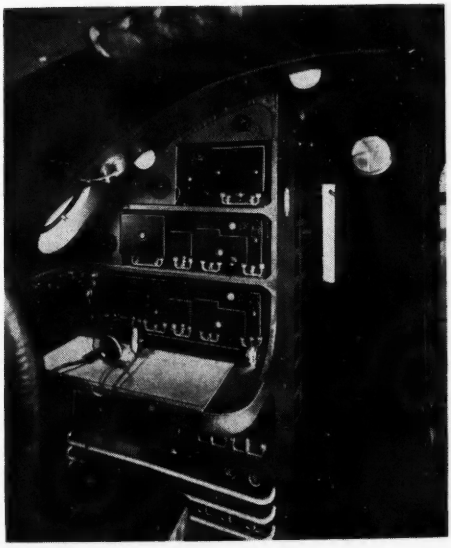
London Electric Wire Co. & Smiths, Ltd., 24, Queen Anne's Gate, London, S.W.1. **C.619.**—This company and its associates, Frederick Smith & Co., the Liverpool Electric Cable Co., Ltd., and the Vactite Wire Co., Ltd., display bare and insulated conductors for all electrical purposes including "Lewmex" insulated wires and strips. Underground power cables; flexibles; resistance wires and tapes; molybdenum wires, tapes and rods; copper-clad, "Vac-steel" and pure nickel wires, etc., are specialities. A resistance wire drawing machine is demonstrated.

Longlamps, Ltd., 24, Marshalsea Road, London, S.E.1. **C.100.**—Fluorescent lamps and fittings, neon and cold cathode tubes.

Joseph Lucas, Ltd., Great King Street, Birmingham, 19. **C.501.**—Electrical equipment and accessories for cars, etc., includes new magneto motor-cycle alternators, anti-dazzle lamps and radio interference sup-







Top left: Type "F" Kango hammer. Left: Londex timer. Above: Marconi high power communications and navigational aid equipment

pressors. The "Freelite" wind-driven electric lighting plant is also demonstrated.

Arthur Lyon & Co. (Engineers), Ltd., Telford Way, Westway Estate, London, W.3. **D.625.**—The 5 kW "Alcomatic" fully automatic generating set.

M.C.L. and Repetition, Ltd., Pool Lane, Langley, Birmingham. **D.414.**—This company specializes in precision repetition work turned from the bar in all metals on automatic and capstan machines.

William McGeoch & Co., Ltd., 46, Coventry Road, Birmingham, 10. **C.325.**—Switch and fuse gear, switchboards, watertight plugs and sockets, lighting fittings and accessories.

McKechnie Brothers, Ltd., Birmingham, 16. **D.515.**—These manufacturers of extruded rods and sections in brass, bronze, nickel silver and copper are exhibiting some of the 16,000 different shapes they produce.

Robert MacLaren & Co., Ltd., 110, Kilburnie Street, Glasgow, C.5. **C.311.**—Temperature control equipment for up to 1,100 deg C, pressure controls and float switches.

Donald MacPherson & Co., Ltd., 21, Albion Street, Manchester, 1. **B.525.**—To demonstrate the heat-resisting qualities of the company's finishes, there is a 3 kW testing bench on which treated metal tubes are heated up to 1,000 deg F. Many of the "Foochow" range of industrial finishes are applicable to the electrical industry.

Macrome, Ltd., Aldersley, Wolverhampton. **D.742.**—A special thermo-electrical treatment applied to engineers' cutting tools imparts added resistance to wear, fatigue and breakage.

Marconi's Wireless Telegraph Co., Ltd., Chelmsford. **C.616.**—A wide range of wireless applications embraces communication (illus. p. 879), aeronautical, broadcasting, radar, and v.h.f. equipment.

Marino Processes, Ltd., Birtley, Co. Durham. **Outdoor 1364.**—Electro-galvanizing plant.

Martindale Electric Co., Ltd., Westmorland Road, London, N.W.9. **C.736.**—"Commstones" are shown both for hand operation and for use with Martindale grinding attachments. Besides the "Jiff-V" undercutter, two new type mica undercutters are on view, the "Imperial," which is driven by a flexible shaft from an electric motor and the "Pneumatic," operated by an air motor inside the hand piece. The company's blowers (illustrated) have been re-designed and an industrial vacuum cleaner is now in full production.

Matthews & Yates, Ltd., Swinton, Manchester. **D.705.**—The new "Cyclone" portable conveying unit has been designed primarily for the speeding up of bulk grain handling in agriculture but it can be used for conveying other materials. Low-speed multivane fans for air conditioning and ventilating plants are displayed with a paddle blade fan designed for fume removal, wood refuse collection and dust collection, etc. Also on show are an electric propeller fan, an axial flow fan and a unit heater.

Measure-Meters, Ltd., Milltown Street, Radcliffe, Lancs. **D.748.**—See Trumeter, Ltd.

Metalectric Furnaces, Ltd., Cornwall Road, Smethwick, 40. **B.309/208 and C.729/626.**—Photographs and models mounted on moving conveyors indicate the wide variety of the company's electric furnaces, which include direct arc steel melting furnaces of capacities up to 30 tons, high-frequency induction heating equipment and dielectric core drying plant.

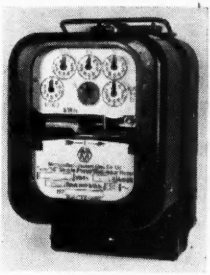
Metallisation, Ltd., Barclays Bank Chambers, Dudley. **D.326.**—Metal-spraying pistols and examples of work metal sprayed.

Metropolitan Electric Cable & Construction Co., Ltd., Clyde Works, Chadwell Heath. **C.413/312.**—Cables and accessories.

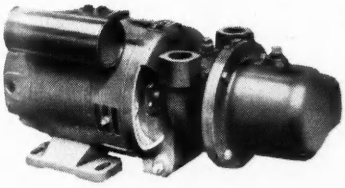
Metropolitan-Vickers Electrical Co., Ltd., Trafford Park, Manchester, 17. **C.510.**—A 6ft model of the dredger *Mersey 26* of the Mersey Docks and Harbour Board draws attention to an electrical power system for propulsion and auxiliary services not hitherto used in this country. An application of the "controlled constant current" principle, the system economizes in the use of the main engine power for propulsion and deck machinery, has great flexibility, avoids overstrain if the propellers are fouled, and prevents overspeed if the propellers are lifted clear or break. The electronic control of deposition of weld metal provides another centre of attraction. A 10 kW radio-frequency heat-treatment and melting unit requires relatively unskilled labour with the minimum of supervision. Meter testing equipment comprises a single-phase meter testing desk with its associated equipment—portable precision wattmeter type SWD, single-phase precision watt-hour meter type EC, and stabilized power unit type 222. The meters being tested are type NF watt-hour meters (illustrated).

Metway Electrical Industries, Ltd., King Street, Brighton, 1. **C.225.**—Besides standard domestic replacement elements, industrial elements, conduit fittings and wiring accessories, porcelain and moulded accessories, and industrial lighting fittings, this company is showing a new complete range of watertight switches, switch plugs, and cable couplings, as well as a new electric kettle (illustrated) in polished aluminium.

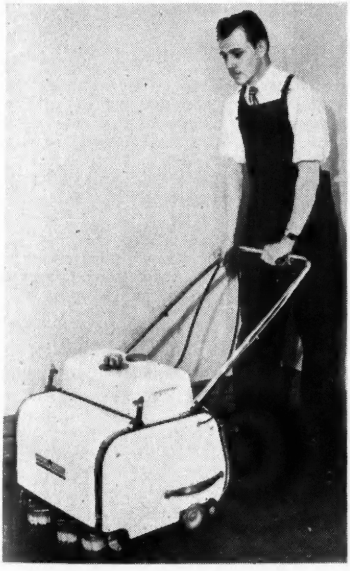
Midland Dynamo Co., Ltd., 64, Belgrave Gate, Leicester. **C.108.**—Among "Quick-

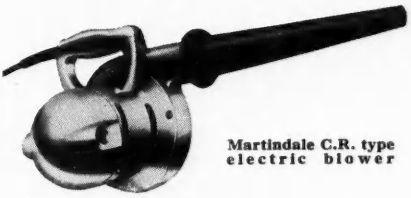


Metrovick type N.F. watt-hour electricity meter



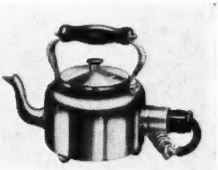
Mono H.M.11 pump and (below) Morphy-Richards "Simon" floor scrubber





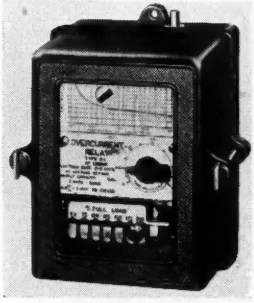
Martindale C.R. type electric blower

Metway electric kettle



"Mixstir" mixing machine (Midland Repetition & Auto Manufacturing Co.)

Nalder Bros. & Thompson single-pole overcurrent relay



way" armature, and coil winding and forming machines, is a new heavy duty armature winding machine designed to wind conductors between 26 s.w.g. and 24 s.w.g. into the slots of two-pole armatures up to 6in diameter, 6in core length at speeds up to 100 turns per minute.

Midlands Electricity Board, Mucklow Hill, Halesowen. **C.509/408.**—Besides serving as an inquiry bureau, this display shows how electricity can increase productivity.

Midland Fan Co., Ltd., 212, Aston Road, Birmingham, 6. **A.622.**—Heavy duty propeller fans with flameproof motors for use in inflammable atmospheres, motor driven dust extracting fans and sheet metal work.

Midland Metal Spinning Co., Ltd., Pelham Street, Wolverhampton. **A.513.**—"Tower Brand" cooking utensils.

Midland Repetition & Auto Manufacturing Co., Ltd., Blackhorse Road, Longford, Coventry. **A.604.**—The "Mixstir" mixing machine (illus. p. 881) with detachable juice extractor gives a choice of eight speeds to deal with all consistencies from liquids to semi-solids. A slicing machine covers all requirements of the catering and provision trades. A 4-pint, 1,500 W kettle has a moulded handle grip.

Minimax, Ltd., Feltham. **B.612.**—Automatic electric water boilers for tea- and coffee-making equipment, etc.

Mirrlees, Bickerton & Day, Ltd., Hazel Grove, Stockport. **D.637/536.**—See Associated British Oil Engines, Ltd.

Mirrlees Watson Co., Ltd., 161b, Buxton Road, Stockport. **D.535.**—An improved model (Mark 2) of the company's automatic electrically-operated coke burning stoker is made in seven sizes handling from 35 lb to 350 lb coke an hour. A sectioned gearbox demonstrates the mechanism.

Monmore Conduits, Ltd., Cable St., Wolverhampton. **D.328.**—Electrical conduit in galvanized, black, silver-grey and self-colour finishes.

Mono Pumps, Ltd., 67, Clerkenwell Road, London, E.C.1. **D.716.**—Among self priming positive rotary pumps are new "H" type stainless steel units for handling food and chemical products. A "D" type pump is demonstrated by circulating a particularly viscous mixture of lime sludge. The "HM" series of pumps (illus. p. 881) for agricultural and domestic duties have flange mounted motors.

Morgan Crucible Co., Ltd., Battersea Church Road, London, S.W.11. **D.305/204.**—"Morganite" carbon overhead wire collectors, seals, gland rings for turbines and compressors, welding rods, brushes, "Reservoil" porous oil-retaining material and bearings, arc lighting carbons and a reflectometer are some of this company's products.

Morgan Ebonite Co., Ltd., Failsworth, Manchester. **D.615.**—Ebonite rod, sheet, tube, mouldings, linings and coverings.

Morganite Resistors, Ltd., Bede Trading Estate, Jarrow. **D.305/204.**—The range of potentiometers has been extended by the production of type "A" supplied with or without switch to meet the demand for a good quality component of a smaller size and at an attractive price. A still smaller midget potentiometer for hearing aids, etc., can be supplied in colours conforming to the B.S.I. Colour Code. The range of fixed type carbon resistors has been concentrated into two types, "R" of 1 W and "T" for all ½ and ¼ W applications. They can be supplied with tolerances of 20, 10 or 5 per cent. Various equipments are available for radio interference suppression.

Morphy-Richards, Ltd., 121, Victoria Street, London, S.W.1. **C.323.**—The "Simon" floor-scrubber (illus. p. 881) scrubs, washes, wipes and dries the floor at the rate of 3,000 sq ft per hour.

B. O. Morris, Ltd., Clay Lane, Coventry. **D.421.**—"Morrisflex" flexible shaft equipment ranges from dental apparatus to heavy machines for the engineering, foundry, motor, stone and glass industries. A feature of the latest polishing shop equipment is the backstand idler with dual speed polishing lathe.

A. C. Morrison (Engineers), Ltd., Loughborough. **C.716 and Outdoor 1324.**—Automatic electric water pumps operating on the jet principle are shown for the first time, together with the latest 25 kVA 4-cylinder diesel generating plant and a 120 W generating set.

David Moseley & Sons, Ltd., Chapelfield Works, Manchester, 12. **D.640.**—The Moseley rubber lamp standard, obtainable in three attractive mottled colours, is unbreakable, cannot scratch polished surfaces, and is shockproof. Other electrical exhibits are seamed gloves and gauntlets, mouldings and insulations.

Moss Gear Co., Ltd., Crown Works, Birmingham, 24. **D.428.**—Worm and helical gear units, geared couplings, etc.

Moulded Products, Ltd., Chester Rd., Birmingham, 24. **C.612.**—Mouldings for the electrical industry include junction boxes, fuse boxes and 30 A cooker switches in a range of bright colours.

Nalder Bros. & Thompson, Ltd., Dalston Lane Works, London, E.8. **C.115.**—Electrical measuring instruments in round and square, flush and projecting pattern metal cases, comprise ammeters, voltmeters, wattmeters, frequency meters,

power factor meters and synchroscopes. The square pattern instruments are shown in new types of cases, and with the minimum of projection. Among relays is an improved over-current relay (illus. p. 881) having inverse and definite minimum time characteristics. It can be supplied with more than one set of contacts without the use of an auxiliary contactor. Recording instruments are also exhibited, together with miniature circuit breakers for the direct starting of motors and the protection of circuits against overload conditions.

Negretti & Zambra, Ltd., 122, Regent Street, London, W.1. **D.237.**—Instruments include electrical thermometers of the indicating, recording, resistance and thermocouple types; air operated controllers; pyrometer controllers; pressure and draught gauges; and transformer temperature controllers.

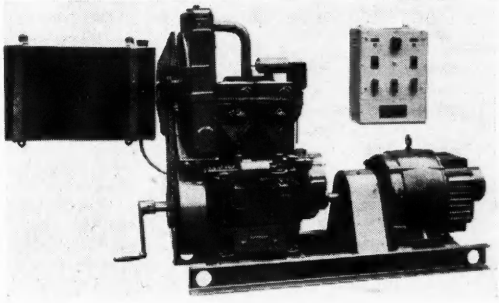
James Neill & Co. (Sheffield), Ltd., Napier Street, Sheffield, 11. **D.341.**—An improved "Eclipse" permanent magnet chuck utilizing "Alcomax" magnets offers a substantial reduction in weight as well as a considerable improvement in magnetic efficiency. A full range of engineers' tools is also on view.

Neon Electric Co., Ltd., 24, Marshalsea Rd., London, S.E.1. **C.100.**—Neon signs.

Neville's (Liverpool), Ltd., Purley Way, Croydon. **D.121.**—Coil winding and wave winding machines, both power and hand operated include reel stands and associated equipment. The latest wave winding machine, the "Wellington" (illustrated) winds coils with diameters of $\frac{1}{4}$in up to 3 in and with any width between $\frac{1}{8}$ in and 1 in. Special attention is also drawn to the "Durban" coil winding machine for shunt, series, transformer and blow-out coils up to 12 in in length.

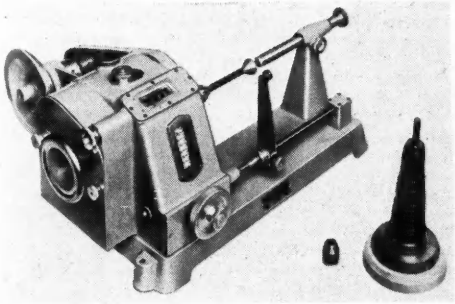
New Day Electrical Accessories, Ltd., 136-8, Mary Street, Birmingham, 12. **C.416.**—All the accessories displayed have been developed since 1946 and incorporate such improved technique as micro-gap switching and quick-fixing "unit" construction. They include flush tumbler switches, a box for flush switch or socket, a neon indicator control switch, a "Twin Two" socket outlet, a press-button 3 kW

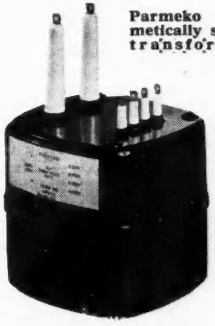
New Day "Fireside" model triple socket outlet



Right: Newage 5 kW automatic diesel lighting set

Neville's "Wellington" wave coil winding machine





Parmeko hermetically sealed transformer

switch-socket and the "Fireside" triple-socket outlet (illus. p. 883).

Newage (Manchester), Ltd., Crossley Street, Manchester, 18. **D.625.**—In association with Arthur Lyon & Co. (Engineers), Ltd., this company is showing a completely self-contained 5 kW 230 V 50 c/s fully automatic lighting set (illus. p. 883). The twin cylinder four stroke diesel engine operates at a governed speed of 1,500 r.p.m.

Newman Industries, Ltd., Yate, Bristol. **C.518.**—Nearly fifty examples of motors are shown including fan cooled flameproof types, standard totally enclosed industrial, loom and fractional horse-power motors. Sectioned models show the application of a "Newman" motor driving a gear unit, and the operation of the new "Elf" fractional h.p. unit. Eight types of starters are displayed.

Newton Brothers (Derby), Ltd., Alfreton Road, Derby. **C.718.**—Automatic carbon pile voltage regulators, rotary transformers and convertors, high frequency alternators and a spinning motor for the rayon industry.

Northern Aluminium Co., Ltd., Banbury. **D.629.**—With photographs of the company's £3,000,000 extension to its Rogerstone works, now nearing completion, are examples of various rolled products in "Noral" alloys.

Northern Rubber Co., Ltd., Victoria Works, Retford. **D.730.**—Natural and synthetic rubber mouldings.

Sir James Farmer Norton & Co., Ltd., Adelphi Iron Works, Salford, 3. **D.165.**—Multiple wire-drawing machines.

Oldham & Son, Ltd., Denton, Manchester. **C.414.**—Besides batteries for motor cars, commercial vehicles, battery vehicles, fork-lift trucks and ships, there are lamps for industrial purposes, including the "Tanka" safety hand lamp. Among a display of mine lighting equipment is an illuminated model self-service lamproom. New uses of the miner's cap lamp for work on overhead lines, etc., are indicated.

Ormond Engineering Co., Ltd., Rosebery Avenue, E.C.1. **C.205.** — Hairdryers, toasters, accessories and repetition parts.

Osborn Mfg. Co., Ltd., 5-13, Highgate Square, Birmingham, 12. **C.111.** — "Cobra" lighting fittings.

Otter Controls, Ltd., Otters Ole, Market Street, Buxton. **C.211.**—This company's new snap action thermostat is extremely small and has only one moving part. It is not subject to vibration because the contacts are pressed together to open them with a definite and decisive snap, while the large area of the thin bi-metal blade makes it very sensitive to temperature change. The new "Clamp-on" unit designed for easy nitting to existing motors on refrigerators, etc., gives protection against both motor overload and heating as well as against excessive current. Also shown are the "Blanketstat," choke indicators, and a new thermal trip for radio work.

P.A.M., Ltd., Merrow, Guildford, Surrey. **C.416.**—The new "Tem-Con" system of temperature control employs contacts requiring a movement of only 0.000002in.

P. B. Sillimanite Co., Ltd., Atlas Road, London, N.W.10. **C.620.**—Furnace refractories, cements and coatings; electrical insulation powders and cements.

Parmeko, Ltd., Percy Road, Aylestone Park, Leicester. **C.207.**—The new "Neptune" hermetically sealed transformers (illus. p. 883), developed for the electronic industry, save up to 30 per cent in volume and weight. A new range of nine different sizes of neon transformers, together with cold cathode lighting transformers, and neon interference suppressors, covers all the requirements of sign manufacturers. The "Safety-Lite" l.v. lighting transformer unit provides safe local lighting for machinery, etc.

Parnall (Yate), Ltd., 43, Park Street, London, W.1. **C.306.**—A new feature is a cooker embodying a thermostat designed to meet the needs of the Canadian market, and complying with the requirements of the Canadian Standards Association. The type E.C.10 and E.C.12 cookers have been designed to meet the preferences of the Western Hemisphere particularly with regard to the drop-down oven door and the location of the grill inside the oven at the top. For the home market there are the E.C.5 and E.C.6 models.

Partridge, Wilson & Co., Ltd., Davenset Works, Evington Valley Road, Leicester. **C.305.**—The unorthodox shape of the "Davenset" high discharge battery tester is both practical and attractive. "Davenset" home chargers are available in two models for 12 V or 6 V batteries. In addition there are power transformers and industrial rectifiers in sizes up to 500 kVA.

W. H. Paul, Ltd., Breaston, Derby. **B.322.**—A new fully automatic dish washer is accompanied by a sterilizing unit (illustrated) for use in dentists' and doctors' surgeries.

Perl Controls, Ltd., 672, Fulham Road, London, S.W.6. **D.643.**—Boiler thermostats, temperature regulators for industrial and domestic use, electromagnetic and solenoid operated "Thermoperl" safety controls.

Petters, Ltd., Falcon Works, Loughborough. **D.637/536.**—See Associated British Oil Engines, Ltd.

Phœnix Sales, Ltd., Winton House, St.

W. H. Paul sterilizing unit for doctors and dentists and (right) Radio Heaters 10 kW induction heating equipment

Andrew Street, London, E.C.4. **A.607/504.**—Irons and vacuum cleaners.

Pinchin, Johnson & Co., Ltd., 4, Carlton Gardens, London, S.W.1. **B.627.**—Protective and decorative finishes.

Pirelli-General Cable Works, Ltd., Southampton. **C.413/312.** — Paper insulated cables up to 300 kV, telephone cables, cable accessories, tapes and compounds, rubber insulated cables and flexibles, covered wires and strips, continuous lead extrusion machines and overhead line fittings.

Plessey Co., Ltd., Ilford. **C.313.**—Communications equipment, radio and television components, "Breeze" wiring accessories and actuators, hydraulic tools and gauges, repetition parts, fluorescent lighting accessories, centrifugal switches and motor start capacitors.

Poles, Ltd., Nickel Works, Tyburn Road, Birmingham, 24. **C.409.**—"Adastra" sectional steel poles.

Powell Duffryn Carbon Products, Ltd., Springfield Road, Hayes, Middlesex. **D.110.**—Dynamo and motor brushes and other carbon products for the electrical industry.

Power Centre Co., Ltd., Lloyd Street, Wednesbury. **C.709/608.**—Industrial distribution gear; overhead busbar, cable trunking and cable tap systems; busbar rising mains; busbar chambers; switchboards; cable boxes; sealing chambers, etc.

Power Specialities, Ltd., Rotoscythe Works, Bath Road, Slough. **A.640.**—"Rotoscythe" lawn mowers.

Precision Metal Spinnings (Stratford-on-Avon), Ltd., 33, Shipston Road, Stratford-on-Avon. **A.531.**—A new range of electric hotplate hollowware for hotel and canteen use is stronger than the conventional cast aluminium type. Electric urns incorporate several new features.

Premier Electric Heaters, Ltd., Keeley Street and St. Andrews Road, Birmingham, 9. **C.302.**—A comprehensive range of domestic appliances includes several "Hystan" period electric coal fires and the latest "Pylon" kettle.

Press Guards, Ltd., 372-8, Farm Street, Birmingham, 19. **D.601.**—Mechanically operating and interlocked machine guards.

Pressed Steel Co., Ltd., Cowley, Oxford. **C.303/204.** — "Prestcold" refrigeration equipment includes 15 to 25 cu ft commercial service cabinets; 3, 4 and 7 cu ft domestic refrigerators; ice-cream conservators and freezers; milk-cooling plant; cooling units and compressors.

Prior Stokers, Ltd., 1-3, Brandon Road, London, N.7. **D.436.**—Two recently produced units, the "Zephair" air heater and coke stoker, both incorporating electric motors and control equipment.

Pritchett & Gold & E.P.S. Co., Ltd., 50, Grosvenor Gardens, London, S.W.1. **C.702.**—Stationary cells of various sizes and capacities as used for emergency lighting in industry, hospitals, cinemas and schools, and for use in power stations and telephone exchanges, are a prominent feature. A typical

switch-tripping cubicle, train-lighting cells —one cut away to show the robust internal construction—aircraft, bus and "Dagenite" car batteries are other exhibits.

Pyrotenax, Ltd., Hedgeley Road, Hebburn. **C.720.**—This company is showing sealing and terminating accessories for its mineral insulated copper-covered cables.

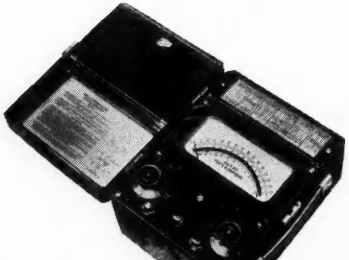
Silas Quaker, Ltd., Crown Yard, London, N.W.2. **C.215.**—Among electrical fittings and accessories are new types of 1in conduit and new "Multiplugs."

Quiz Electrics, Ltd., 160, High Street, Teddington. **C.742.**—The "Handy-Andy" warm air hand dryer is cheaper to use than towels.

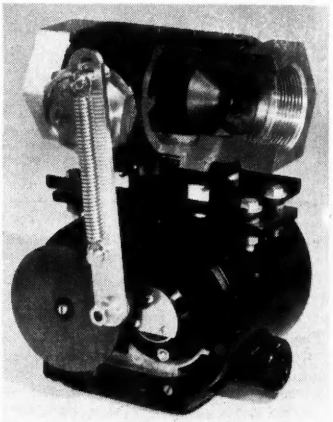
Radio Heaters, Ltd., Wokingham. **C.219.**—A special feature is made of induction heating (illus. p. 885) and thermo-plastic sheet welding equipments, a large press welder producing in a single shot a very large inflatable beach ring. A 10 kW equipment is shown complete with automatic handling gear for surface hardening shafts.

Ramus Tile Co., Ltd., Sumara Works, Albert Road, London, N.22. **B.216.**—Fireplaces incorporating electric fires.

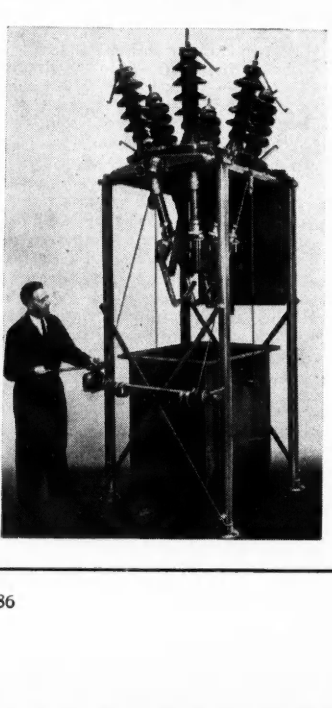
Range Boilers, Ltd., Bridge Street, Stalyb



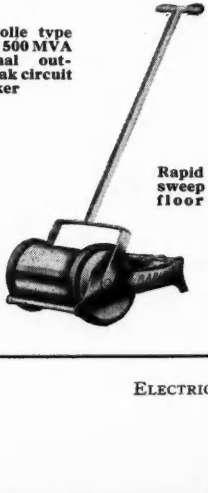
Sangamo Weston multi-range test set



"Satchwell" PMSX electrically operated modulator valve (Rheostatic Co.)



Left: Reyrolle type ORT2 33 kV 500 MVA open-terminal outdoor oil-break circuit breaker



Rapid "Magnasweep" magnetic floor sweeper

bridge. **B.300.**—Water heating apparatus.

Rapid Magnetting Machine Co., Ltd., Lombard Street, Birmingham, 12. **C.421.**—Of special interest among magnetic (electro and permanent) separators and extractors, electric lifting magnets, clutches, brakes, etc., are new types of super-strength permanent magnet drums, pulleys, chutes and bar magnets for textile machinery; the Crockett submerged belt type magnetic separator for the positive recovery and cleansing of media such as "Ferrosilicon" and "Magnetite" used in heavy-media separation processes; the "Magnagrid" for insertion into feed hoppers; the "Magnasweep" magnetic floor sweeper (illustrated); the "Magnaclamp" for work-holding, and a magnetic drill extractor for the recovery of broken bits.

Rawlplug Co., Ltd., Cromwell Road, London, S.W.7. **C.707.**—The new "Rawltie" speeds the erection and dismantling of timber formwork for concrete projects. "Rawloops" and "Rawlhangers" are adaptations and their uses are also demonstrated. For making holes for fixing work the R.P.1 low-speed electric drill is geared down to 400/600 r.p.m.

Redfern's Rubber Works, Ltd., Hyde, Ches. **D.345.**—Industrial rubber and ebonite mouldings, etc.

C. E. Reed & Co., Ltd., Progress Works, Chittening Estate, Avonmouth. **C.702.**—Features of a 2 ton electric hoist demonstrated are the "close-lift" which allows the inside of the hook to be taken to 14 in from the underside of the travel monorail, and the creeping gear which provides a fixed alternative creeping speed up or down of about 18 in per minute.

Resinoid & Mica Products, Ltd., Mary St., Birmingham, 12. **C.416.**—Plastic mouldings, "Micanite" and "Bakelite" insulating tubes and moulded parts, mica and "Micanite" washers and cut pieces, and heating elements.

Revo Electric Co., Ltd., Tipton, Staffs. **C.301.**—The new "Peerless" and "Pearl" cookers are available both as table cookers or, with a special stand, to provide the cooking facilities of a full sized model, yet they can be connected to a standard 13 A or 15 A plug. The "Princess" cooker is now available in five separate models, while the "Duchess" model incorporates features preferred by the overseas buyer. The company's "R" series is also shown. Domestic appliances include the streamlined heat-controlled "Revomatic" iron, the "Revomatic" kettle, the "Electrajug," "Challenger" and "Portex" irons, several new fires and tubular heaters, two small table cookers—the "Dandy" and "Chef," and the "Twin" portable boiling table. Among industrial and house-service switchgear the new consumers' service units are a special feature and new fans provide a further item of interest. "Trufolite" and "Fullalite" reflectors illuminate the stand and there are examples of new decorative fluorescent and street lighting fittings, the latest "Silverblue" lantern and "Sol-etern" units. Concrete and cast iron standards and brackets are sited at entrances to the Fair buildings.

A. Reyrolle & Co., Ltd., Hebburn-on-Tyne. **C.405.**—The central exhibit is a type-ORT2 33 kV 500 MVA outdoor open-type circuit-breaker (illustrated), with its associated isolators. The straightforward construction with its three single breaks ensures economy in first cost and maintenance. A welded-steel top-plate supports the six bushings carrying the contacts, the welded-steel tank, and the operating-mechanism. The current transformers are accommodated round the bushings. The unit is despatched in one piece for mounting on lightly-braced tubular pillars. In another switchgear panel, a 3.3 kV 800 A 150 MVA air-break circuit-breaker, one side of the sheet-steel enclosure has been replaced by "Perspex" sheets. Separate compartments house the busbars, the current transformers, and the air-break circuit-breaker, which has castor wheels to facilitate withdrawal. The voltage-transformer isolation gives ready access to the primary fuses. A third unit for a ring-main tee-off comprises two 400 A oil-break isolators and one 400 A oil-break circuit-breaker with making-capacity and breaking-capacity ratings of 150 MVA and 250 MVA at 6.6 kV and 11 kV respectively. A multi-circuit HH switch and fuse distribution board shows typical units available. Feeder and transformer protective gear are also represented.

Rheostatic Co., Ltd., Slough. **C.500.**—Among a complete range of automatic temperature control devices are oven thermostats, immersion type water heater thermostats, room thermostats, and thermostats and motorized valves (illustrated) for central heating installations.

Richards & Ross, Ltd., Merrils Lane, Wednesfield. **D.617/516 and D.619/518.**—Tubing for power stations.

Riley Stoker Co., Ltd., 19, Woburn Place, London, W.C.1. **D.241.**—Automatic stokers, "Syntron" vibrators, etc.

Robot Glass Cleaner Co., Ltd., Grove St., Birmingham, 18. **C.224.**—Glass and cup washing machines.

Rockweld, Ltd., Commerce Way. Croydon. **D.537.**—Electrodes and equipment for electric arc welding.

Rolls Switches, Ltd., 154/156 Blackfriars

Rd., London, S.E.1. **C.213.**—A new SA switch has only one moving part, solid silver contacts and a smooth snap action.

Donald Ross & Partners, Ltd., 1/3, Arlington Rd., London, N.W.1. **D.134.**—Electro-hydraulic welding positioners.

Rotherham & Sons, Ltd., 27, Spon St., Coventry. **D.624.**—Time delays, process timers, recording clocks, etc.

J. Rowell & Son, Ltd., Thermecon Works, Boyd St., Newcastle-on-Tyne. **A.650.**—"Ace" washing machines operating on a new agitation principle.

Rubber Bonders, Ltd., Dunstable. **D.700.**—Parts in rubber bonded to metal, flexible couplings, anti-vibration mountings, etc.

Ruberoid Co., Ltd., 1/19, New Oxford St., London, W.C.1. **B.423.**—Electrical insulating materials.

Rubery, Owen & Co., Ltd., Darlaston, South Staffs. **D.717/616.**—Products of the Owen Organization comprise "Conveyancer" battery operated fork lift trucks, and "Invicta" electrodes.

E. Rudd & Co., Ltd., Island Works, Holyhead Rd., Birmingham, 21. **C.216.**—Nameplates and labels.

Runbaken Electrical Products, 71-73a, Oxford Road, Manchester, 1. **C.732.**—Exhibits of special interest are an oil immersed trickle charger, a dual "Testoscope" for fault finding on 0-30 V and 100-850 V a.c. or d.c., a new illuminated one-hand battery tester, the "Synchrolite" engine timer, the "Ecko" armature tester, "Quickheat" soldering tongs and the "Autofeed" soldering iron.

Ryland Works, Ltd., Chesterfield. **A.519.**—Oven thermometers.

St. Helens Cable & Rubber Co., Ltd., Slough. **C.413/312.**—Cables and accessories.

Sangamo Weston, Ltd., Great Cambridge Row, Enfield. **C.505.**—In addition to house service and portable rotating substandard time switches and small synchronous motors for electric clocks, process timers, time switches, etc., there is a representative range of Weston electrical instruments including laboratory standards, portable instruments, the S.75 test set (illus. p. 886) with fifty-three ranges, d.c. galvanometers, frequency meters, a radio analyzer, panel and switchboard instruments, relays operating on currents as low as 5μA, photometers and exposure meters, and aircraft instruments.

Saniguard Appliances, Ltd., 62, London Wall, London, E.C.2. **B.205.**—See Barrywald Products, Ltd.

J. H. Sankey & Son, Ltd., Ilford. **B.405.**—Fire and acid resisting bricks and cements.

Schori Metallising Process, Ltd., Brent Crescent, London, N.W.10. **D.524.**—A full scale shot blast and spraying unit demonstrates the Schori method of flame spraying metals and plastics by the powder process.

Sciaky Electric Welding Machines, Ltd., Farnham Road, Slough. **C.222.**—The latest design of the SAT.75 three-phase pneumatically operated, electronically controlled, spot welding machine, having a nominal rating of 75 kVA, is arranged for balanced load operation at a power factor of not less than 85 per cent. The single phase RAMU.50 pneumatically operated, motor driven, universal seam welding machine, has a 24 in working throat depth and is arranged for circumferential and longitudinal welding. The SAC.25/2 high speed stitch welding machine has a welding capacity of up to two thicknesses of $\frac{1}{8}$ in mild steel.

Scottish Cables, Ltd., Deanside, Renfrew. **C.319.**—Paper and rubber insulated cables range from the smallest flexible to 33 kV types. A cut-away 33 kW straight-through cable joint is shown.

Senior Economisers, Ltd., 11, Southampton Row, London, W.C.1. **D.241.**—The main exhibit is a full sized model of the welded type economiser as used in power stations at pressures ranging from 600 to 2,100 lb/sq in. A quarter-scale model of the Senior "H" economiser used for pressures up to 450 lb/sq in is fitted with a traversing-type soot blower. A section of the "Twintube" economiser for higher pressures illustrates the method of jointing where welding is not suitable.

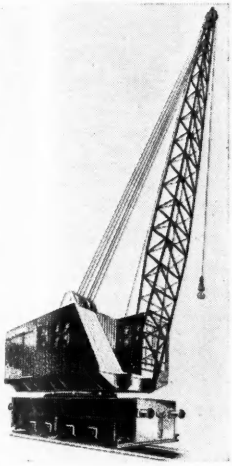
Sharp Control Gear, Ltd., 26, Redditch Road, Birmingham, 30. **C.209.**—On this stand can be seen control gear for use on electric cranes, vehicles, trucks, diesel locomotives, etc.; patent cam operated contactors up to 150 A; switchgear for mines; limit switches of all types; reversing switches for vehicles, etc.; hoist pendant switches; manual and automatic pushbutton and star delta starters; foot operated switches, magnetic contactors, etc.

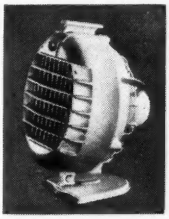
Siemens Bros. & Co., Ltd., Woolwich, London, S.E.18. **C.413/312.**—Cables and accessories.

Sigma Instrument Co., Ltd., Letchworth. **D.319/216.**—Multi-dimension machines for the inspection of mass production; also mechanical comparators for quality control at the machine.

Sigmund Pumps, Ltd., 52, Grosvenor Gardens, London, S.W.1. **D.337.**—Pumps of various types.

Silent Machine & Engg. Co., Albion Works, Sheffield. **D.719 and Outdoor 1360.**—"Ward-Swift" food preparation machinery.

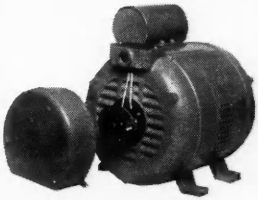




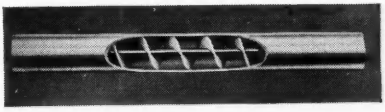
Left : Thomas Smith 10 ton diesel electric shunting crane

"Spiraluxe" unit heater (Spiral Tube & Components)

Tilling-Stevens motor with centrifugal switch cover removed



T.C. & M. helical membrane type cable



Silvertown Lubricants, Ltd., Minoco Wharf, London, E.16. **D.737.**—Insulating materials, oils, rust resisting solutions and preservatives.

Simmonds Aerocessories, Ltd., Treforest, Glam. **D.427.**—A new self-locking nut, the "Nyloc" has a moulded nylon insert designed to withstand extremes of temperature and humidity. Elastic stop nuts, "Pinnacle" metal diaphragm nuts, "Spire" speed nuts, liquid contents gauges, the "Fram" oil cleaner and "Simmonds Jontix" sealing compound are other products.

James Smellie, Ltd., Ivanhoe Works, Oxford Street, Dudley. **B.628.**—Inset and portable fires.

Smith Bros. & Webb, Ltd., Stratford Road, Birmingham, 11. **D.133.**—"Powalastik" individual driving units, comprising electric motor, starters and switchgear, readily permit belt-driven machines to be converted to independent motor drive. A patented method of belt tensioning ensures high efficiency on short-centre drives.

Frederick Smith & Co., 24, Queen Anne's Gate, London, S.W.1. **C.619.**—Commutator copper; power, trolley and line wires are among this company's products.

Herman Smith, Ltd., Reliance Works, Dudley. **C.606.**—"Smithlite" fluorescent lighting fittings for industrial, commercial and domestic use, include two new fittings, one in illuminating glass suitable for two or four lamps in all sizes, and the other a utility batten fitting.

John Smith (Keighley), Ltd., Crane Works, Keighley. **D.719 and Outdoor 1360.**—Overhead travelling and derrick cranes.

Thomas Smith & Sons (Rodley), Ltd., Rodley, Leeds. **Outdoor 1362.**—A 10-ton diesel-electric shunting crane (illustrated) incorporates a power unit comprising a diesel engine, with electric starter, and generator having an output of 75 kW at 230 V d.c. It is arranged to operate a 52in diameter lifting magnet, but alternatively may be used to handle loads by single end of rope or snatch block. The crane travels under its own power on a 4ft 8½in gauge track. There are separate motors for hoisting (60 b.h.p.), slewing (7½ b.h.p.), derricking (20 b.h.p.) and travelling (two 25 b.h.p.). The controllers have separate resistances and a crane control panel is fitted. Dynamic braking is provided for lowering, with solenoid brakes for the motions.

Smiths Industrial Instruments, Ltd., Cricklewood Works, London, N.W.2. **D.727.**—Of particular interest this year is the new hand tachometer, the extended range of "Desynn" remote indication instruments and pick counters for the textile trade. Also shown are speed indicators, tachometers, pocket timers, oil pressure gauges, thermometers, thermostats, pressure vacuum and compound gauges, etc.

Sperryn & Co., Moorsom Street Works, Birmingham, 6. **D.543.**—Electrical accessories, switches, lampholders, etc.

Spiral Tube & Components Co., Ltd.,

Honeypot Lane, Stanmore. **D.710.**—The 3 kW "Spiraluxe" unit heater (illust. p. 889), available in both portable and wall mounting types, incorporates an automatic thermal cut-out. Other products exhibited include transformer oil coolers, air heaters and coolers for air-conditioning, etc.

Standard & Pochin Bros., Ltd., Evington Valley Road, Leicester. **D.249.**—Air heaters, air filters, dust collecting and refuse removal equipment, "Calorier" unit heaters, "Calorad" radiators, fans, blowers, etc.

Standard Telephones & Cables, Ltd., Connaught House, Aldwych, London, W.C.2. **C.621/520.**—Cables and accessories.

Stanton Ironworks Co., Ltd., near Nottingham. **B.717/626 and Outdoor 1326.**—Spun concrete lighting columns and transmission poles, pipes, flexible joints, etc.

Sterling Cable Co., Ltd.—Aldermaston. **C.235.**—All types of electric cable insulated with paper, cambric, rubber and plastic are represented. Special items are television camera cable, television lead-in cables designed for use in "fringe areas," the latest British Post Office twin distribution cable, and a trailing cable used in a tropical swamp for supply power to a dredger at 3.3 kV.

B. J. M. Stern, Ltd., Roscoe Street, Oldham. **C.725.**—Domestic and commercial refrigerators.

Sternol, Ltd., Royal London House, Finsbury Square, London, E.C.2. **D.751.**—Lubricants and rust preventatives.

Stewarts & Lloyds, Ltd., Broad Street Chambers, Birmingham, 1. **B.404, D.511/408 and Outdoor 1333/1232.**—Tubular steel lighting columns.

Stirling Boiler Co., Ltd., Babcock House, Farringdon Street, London, E.C.4. **D.407/306.**—Water-tube boilers and firing equipment.

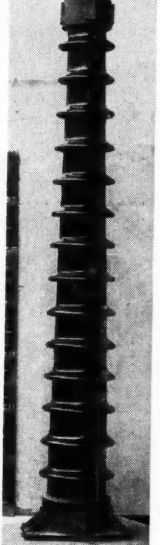
Stothert & Pitt, Ltd., Bath. **Outdoor 1101/1000.**—A 28 cu ft crane-fed portable batching and mixing plant.

Streetly Mfg. Co., Ltd., Streetly, Sutton Coldfield. **C.307.**—Specimens of electrical mouldings include electric razor components, a G.P.O. terminal strip, injection mouldings and "Beetleware" products.

W. & S. Summerscales' Sons, Ltd., Parkside Works, Keighley. **A.521.**—Washing machines and wringer heads for use on washing machines.

Sumo Pumps, Ltd., Lighthouse Works, Smethwick. **C.622.**—Portable submersible electric pumping units are available from sizes to fit a 6in bore-hole upwards. The smallest will pump up to 3,000 gal an hour.

B. & P. Swift, Ltd., Century Works, London, S.E.13. **C.320.**—Reduction gears, selectors and solenoids.



Porcelain cable sealing end (112 in high) for 264 kV (Taylor Tunnicliff)

Taylor & Challen, Ltd., Constitution Hill, Birmingham, 19. **D.415.**—Power presses.

Taylor Tunnicliff & Co., Ltd., Hanley, Stoke-on-Trent. **C.212.**—A 264 kV stabilized glaze pressure cable sealing end (illustrated) indicates how a single piece porcelain withstands an internal operating pressure of 200/250 lb per sq in with the outer surface in semi-conductive glaze to give a measure of axial voltage control and improved performance under adverse weather conditions. Fittings used on light line transmission work, post type insulators, l.v. porcelain components for electrical accessories and refractory formers for high temperature element supports are also among the company's products.

Telegraph Construction & Maintenance Co., Ltd., 22, Old Broad Street, London, E.C.2. **C.413/312.**—"Telcon" products include a new air-spaced coaxial cable (illus. p. 889) with a helical membrane of "Telcothene" round the inner conductor; a new air-spaced coaxial cable (thimble insulation); special screened cables for television studio equipment; television camera cable; a new 300 ohm tubular feeder; power transmission and distribution cables; thermoplastic cables and flexibles; copper wire, single and stranded conductors and cable accessories.

Herbert Terry & Sons, Ltd., Redditch. **B.424.**—"Anglepoise" lamps, springs, presswork, flexible shafting, hose clips, etc.

Bertram Thomas (Engineers), Ltd., Worsley Street, Manchester, 15. **D.309.**—Electric dinner wagons, hotplates, plate-warmers, radiators, tubular heaters, car heaters, switchboards, high-speed circuit breakers and automatic switchgear.

Richard Thomas & Baldwins, Ltd., 47, Park Street, London, W.1. **D.301/200.**—Flat rolled steel products.

John Thompson, Ltd., Ettingshall Works, Wolverhampton. **D.521/418.**—Boiler house plant.

Thor Appliances, Ltd., 55-59, Oxford Street, London, W.1. **C.604.**—"Thor Automagic" clothes and dish washer.

Thorn Electrical Industries, Ltd., 105, Judd Street, London, W.C.1. **C.517.**—"Atlas" lamps, fluorescent lighting fittings and control gear, fluorescent theatre lighting, "Mary Ann" irons, vacuum cleaners and food mixers.

Tilling-Stevens, Ltd., Victoria Works, Maidstone. **C.206.**—The normal production range of a.c. squirrel cage induction motors from ¼ h.p. to 1 h.p. single-phase capacitor start (illus. p. 889) and from ¼ h.p. to 10 h.p. three-phase is represented. For all frame sizes up to 2 h.p. the company's patented fabricated lightweight method of construction is used. A sectioned motor indicates this method of construction. For the larger horsepowers lightness is achieved by the use of aluminium alloy castings. The dual fan centre aperture system of cooling is demonstrated by "streamers," while the action of the centrifugal switch, mounted externally, is shown by a motor starting and stopping every minute. A 3 h.p. sectioned motor is seen running immersed in water. A d.c. traction motor with patented controller and a partially wound 17 kVA alternator stator are also on view.

Joseph Tomey & Sons, Ltd., Catherine Street, Aston, Birmingham. **D.703.**—Pressure vacuum gauges, thermostats, oil pressure switches, etc.

Trico-Folberth, Ltd., Great West Road, Brentford. **C.318.**—Four universal interchangeable windscreen wiper motors have been designed to replace as many as 500 original equipment models fitted to different makes of American cars and trucks. Other motor-car equipment includes de-frosters, horns, control switches, direction indicators, the "Clignoteur" flashing light system and press-button equipment.

Ronald Trist & Co., Ltd., Bath Road, Slough. **D.539.**—Steam boiler controls and alarms, electronic fire detectors, etc.

Trumeter Co., Ltd., Sunnyside, Leicester Road, Salford, 7. **D.748.**—Counting and measuring machines.

Tube Investments, Ltd., Aston Manor, Birmingham, 6. **D.617/516 and D.619/518.**—The Tube Investments Group includes the Simplex Electric Co., Ltd., manufacturers of switch and fuse gear, domestic appliances, etc.

Tube Products, Ltd., Popes Lane, Oldbury, Birmingham. **D.627/516 and D.619/518.**—"Tru-Wel" steel tubes for the electrical trade.

Tudor Accumulator Co., Ltd., 50, Grosvenor Gardens, London, S.W.1. **C.109.**—The Tudor A1 "Safetylyte" emergency lighting set takes a prominent place among a display of batteries for power stations, telephone exchanges, electric vehicles, ships, etc.

Turner Brothers (Birmingham), Ltd., Cliveland Street, Birmingham, 19. **D.512.**—Power presses, pressings, die castings, etc.

Turner Manufacturing Co., Ltd., Villiers Street, Wolverhampton. **D.316.** — The major features of this display are 50 ton and 125 ton self-contained hydraulic plastics presses and hydraulic pumps.

Turton Brothers & Matthews, Ltd., P.O. Box 40, Sheffield, 6. **D.413.**—Of special interest among permanent magnets made for telephones, radio, electricity meters and instruments are composite units incorporating blocks of "Alnico" or "Alcomax" brazed to mild steel pole pieces, thus overcoming a difficult assembly problem.

Vactite Wire Co., Ltd., 24, Queen Anne's Gate, London, S.W.1. **C.619.**—See London Electric Wire Co., & Smiths, Ltd.

Van Dorn Electric Tools, Harmondsworth. **C.607.**—See Black & Decker, Ltd.

Victaulic Co., Ltd., 113, Park Lane, London, W.1. **D.511/408 and Outdoor 1333/1232.**—Flexible joints, couplings, etc., for use in power station installations, etc.

Walker Fender Co., Ltd., Sherborne Street, Birmingham, 16. **A.230.**—Table and floor standards.

James Walker & Co., Ltd., "Lion" Works, Woking. **D.430.**—Packings and jointings.

Walls, Ltd., Palmer Street, Birmingham, 9. **A.313.**—Electric kettles, fires, heaters, hollow-ware, etc.

Walsall Conduits, Ltd., Excelsior Works, West Bromwich. **C.715.**—Steel conduit and fittings, switches, switchplugs including weatherproof units, fuseboards, switchgear, industrial flameproof lighting equipment, cable trunking, underfloor ducting, tubular heaters, etc.

Thos. W. Ward, Ltd., Albion Works, Sheffield. **D.719 and Outdoor 1360.**—Overhead travelling cranes and derricks; pumps and compressors; wood-, metal- and stone-working machinery, and "Ward-Swift" food-preparing machinery, are some of the products of this company and its associates.

Warico (Gt. Britain), Ltd., 2, North Street, Coventry. **B.305/204.**—Electric fireplaces.

H. C. Webb & Co., Ltd., Tame Road, Birmingham, 6. **A.511.**—The improved 14in electric lawnmower is fitted with a streamline housing completely covering the motor and switchgear, and fully insulated handle grips and handle switch, the latter having a spring return thumb control safety catch to prevent accidental switching on.

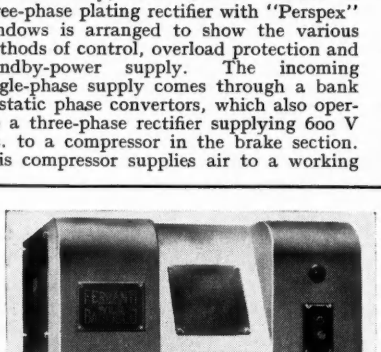
Webley & Scott, Ltd., Weaman Street, Birmingham, 4. **A.615.**—Electric fans are among the items shown.

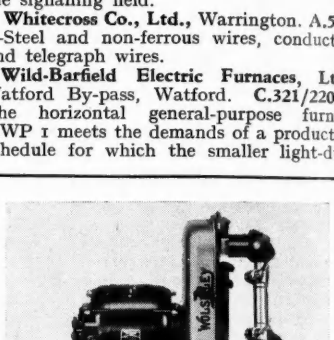
Weldall & Assembly, Ltd., Eyre Street, Birmingham, 18. **Outdoor 1328.**—Domestic electric washing machines are products.

Westinghouse Brake & Signal Co., Ltd., 82, York Way, London, N.1. **C.508.**—A three-phase plating rectifier with "Perspex" windows is arranged to show the various methods of control, overload protection and standby-power supply. The incoming single-phase supply comes through a bank of static phase convertors, which also operate a three-phase rectifier supplying 600 V d.c. to a compressor in the brake section. This compressor supplies air to a working exhibit in the colliery demonstration, viz., to a pneumatic tub retarder, and also operates manual and electro-pneumatic control gear associated with air-operated presses, rammers and machine tools. A model track shows the latest developments in mine signalling apparatus, while searchlight and multi-aspect signals with corrosion-proof aluminium cases demonstrate progress in the signalling field.

Whitecross Co., Ltd., Warrington. **A.518.**—Steel and non-ferrous wires, conductors and telegraph wires.

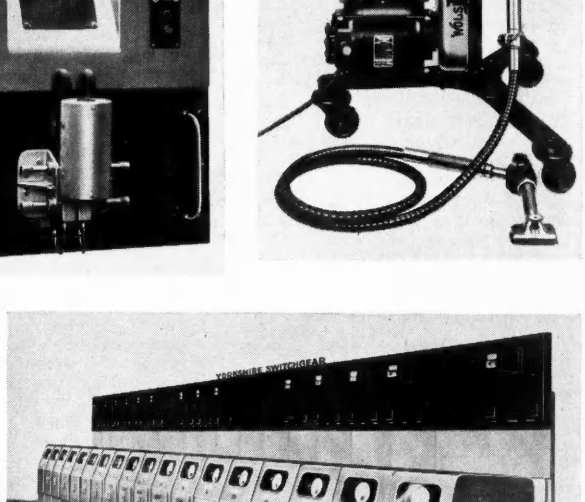
Wild-Barfield Electric Furnaces, Ltd., Watford By-pass, Watford. **C.321/220.**—The horizontal general-purpose furnace HWP 1 meets the demands of a production schedule for which the smaller light-duty





Above: Radio-frequency standard workhead (Wild-Barfield Electric Furnaces)

Above right: Wolseley industrial electric clipping machine



Right: Yorkshire Switchgear eighteen panel 6.6 kV 150 MVA single busbar switchboard

furnace is inadequate and the full-scale production furnace not economical. It is equipped with "Paragen" atmosphere control. In the vertical general-purpose furnace VWP 1 heat losses are minimized by specially designed split-type roll-off doors. For laboratory use there are the rectangular muffle M.254 and the tube muffle M.94, while the high thermal efficiency, precise temperature control and simplicity of operation make the high-speed twin-chamber steel furnace HSF 25 suitable for the pre-heating and hardening of high-speed steels in the toolroom. Due to the close temperature control provided, the most delicate tools may be treated without risk of damage in the toolroom tempering furnace TRT 1010. The forced-air circulation furnace 1612C is equipped with charge progress recorder. A radio-frequency standard workhead (illustrated) covering a wide range of components and purposes is supplied as a bench-mounting model or mounted on a tubular framework or on a quenching tank. The Ferranti-Wild Barfield high-frequency dielectric heating set 2 BDP has been designed specially for the pre-heating of plastic materials. Induction heating equipments ranging from 2.5 kW to 60 kW input has been specifically designed for industrial use. Besides being easily maintained, they are equipped with all necessary devices for protecting personnel and equipment.

Wilkins & Mitchell, Ltd., Darlaston. **C.713 and D.600.**—Two new washing machines have been specially designed for export. Power presses and soldering irons are other products.

Williams (Birmingham), Ltd., Westwood Road, Birmingham, 6. **A.413/314.**—"Atlas" utensils specially made for electric cooking.

W. & A. Williamson & Co., Ltd., 12, Greek Street, London, W.1. **A.524.**—Headlamps.

Willmot Trucks, Ltd., Scotts Green, Dudley. **D.644.**—Electric industrial, elevating, fork lifting and refuse collecting trucks are among the products of this company.

R. H. Windsor, Ltd., 16, Finsbury Square, London, E.C.2. **C.227/104.**—Injection moulding and extrusion machines include a 48 oz injection extrusion combined machine and a new multi-screw extrusion machine.

Wire Drawing Dies (Manchester), Ltd., Adelphi Iron Works, Salford, 3. **D.165.**—Dies for wire drawing.

Wireohms, Ltd., Peas Hill Road, Nottingham. **C.316.**—See H. J. Baldwin & Co., Ltd.

Alfred Wiseman & Co., Ltd., Carlisle House, 8, Southampton Row, London, W.C.1. **D.148.**—Besides the latest resilient traction gear wheels and totally enclosed reduction gears there is overhead line equipment for trolley-buses and trams including a complete turnout assembly set for trolley-buses.

Wolf Electric Tools, Ltd., Hanger Lane, London, W.5. **C.603.**—A complete display of electric tools comprises portable drills, screwdrivers, grinders, polishers, sanders, blowers, chisel mortisers, hammer kits, a range of engine reconditioning equipment and solderguns. New items introduced are a 4in hand grinder, a 7in horizontal sander and the "Cub" home constructor's multi-purpose tool kit.

Wolseley Sheep Shearing Machine Co., Ltd., Electric Avenue, Birmingham, 6. **D.713 and Outdoor 1337/1236.**—Apart from electric animal goads, dairy bucket heaters, fencers, loaders, horse and cattle clipping machines, sheep shearing machines, pumps, milk coolers and dairy equipment, there is an industrial clipping machine, Model 1 (illustrated) designed primarily for clipping the pile from the edges of carpets preparatory to folding over the edges for stitching or binding, but also suitable for the boot and shoe, glove and numerous other industries.

Yale & Towne Manufacturing Co., Ltd., Willenhall, Staffs. **D.423/324.** — The "Wizard" electric hoist weighs only 120 lb for a $\frac{1}{4}$ and $\frac{1}{2}$ ton capacity and has a speed of 15ft per minute.

Yardley Wavis, Ltd., 1, St. Julien's Friars, Wyle Cop, Shrewsbury. **C.704.**—Small house lighting and battery charging plants and fully automatic diesel driven alternator sets, 110 V and 230 V a.c.

Yorkshire Copper Works, Ltd., Leeds. **B.723/634.**—Tubes for condensers, refrigerators and other electrical purposes.

Yorkshire Switchgear & Engineering Co., Ltd., Meanwood, Leeds, 6. **C.231.**—As an example of the company's inverted vertical isolation outdoor or indoor switchgear (illustrated) there is a 5-panel board suitable for up to 11 kV and rupturing capacities up to 250 MVA, the industrial units being of the hand-closed, spring-closed and solenoid-closed types. A ring main unit with isolatable isolators is available for all ratings and voltages up to 1,000 A, 11 kV 250 MVA.

Young Accumulator Co., Ltd., 95, Aldwych, London, W.C.2. **C.609.** — See Crompton Parkinson, Ltd.

Zinc Alloy Rust-Proofing Co., Ltd., Shakespeare Street, Wolverhampton. **B.724.**—This company specializes in rust-proofing such items as electrical conduit by the "Sherardizing" process.

London Displays

Exhibits are at Olympia Unless Otherwise Stated

Accles & Pollock, Ltd., Oldbury. **C.62.**—Among tubes used in instrument manufacture are double and single Bourdon coil tubes, pointer tubes, tubes for pressure gauge, small diameter multibore and composite tubes and capillary tubes in steel and copper.

Acousticon (General Acoustics, Ltd.), 122, Wigmore Street, London, W.1. **C.85.**—The new "Constellation" hearing aid and a range of air and bone conduction receivers are exhibited with the "Radion" attachment, measuring only $3\frac{1}{2}$ in by $\frac{7}{8}$ in, which turns the hearing aid into a portable radio receiver. The Acousticon-N.E.P. cardiophone, an improved miniature amplifier for use with a physician's stethoscope has high fidelity variable amplification and controllable selectivity.

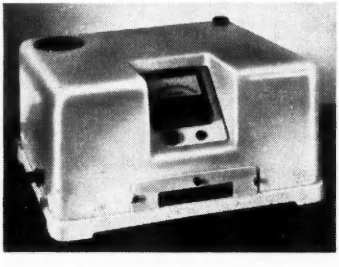
Adamson & Co. (Machines), Ltd., Prospect Works, Upper Accommodation Road, Leeds. **Earls Court W.115.**—Electric cloth-cutting machines.

Airmec Laboratories, Ltd., High Wycombe. **C.14.**—An electronic process timer, an electronic decade counter, a stabilized power supply unit, oscilloscopes, a radiation monitor and a frequency meter are items of special interest.

B.X. Plastics, Ltd., Higham Station Avenue, London, E.4. **Earls Court R.2 and R.33.**—Thermoplastic materials.

Baird & Tatlock (London), Ltd., Freshwater Road, Chadwell Heath. **C.57.**—The new B.T.L. self-balancing photo-electric recording absorptiometer (illustrated) may be calibrated to record the composition of any liquid whose absorption can be related to some form of chemical analysis or turbidity. Another new instrument, the Preston density comparator, is used in the process control in glass manufacture. The gypsum absorption cell for the determination of soil moisture content, the "Bara-Gyro" centrifuge and a wide range oven are also shown.

Baird & Tatlock (London) absorptiometer



Bakelite, Ltd., 18, Grosvenor Gardens, London, S.W.1. **Earls Court R.2 and R.33.**—See Birmingham Section.

Baldwin Instrument Co., Ltd., Brooklands Works, Dartford. **C.5.**—A comprehensive display of instruments includes photometers, densitometer attachments for photographic work, a Gamma radiation detector, a pocket ionization chamber, a Ealdwin-Farmer protection electrometer, an "Io.. x" ionization meter (illustrated), an X-ray .onitor, a beta ray thickness gauge, the Baldwin-Dunlop "Statigun" electrometer for the detection and measurement of electrostatic charge on stationary or moving objects, a visual null indicator, a moisture meter, a mains resistance meter, electrometer-voltmeter, decade resistance boxes, the "Logohm" resistance bridge and a d.c. potentiometer.

Bellingham & Stanley, Ltd., 71, Hornsey Rise, London, N.19. **C.55.**—Colour testing apparatus, photometers, etc.

Bellow Machine Co., Ltd., Grafton Street, Leeds, 7. **Earls Court W.1.**—Electric cloth-cutting machines.

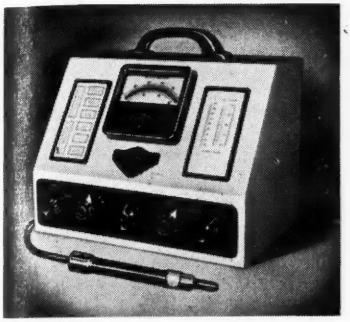
E. J. Bowman (London), Ltd., 58, Paddington Street, London, W.1. **Earls Court V.10.**—The new "Magimix" mixing machine (illustrated) is available with a 6-pint mixing bowl.

E. A. Braddick, Ltd., Field House, Breams Buildings, Fetter Lane, London, E.C.4. **Earls Court T.19.** — Printing machinery includes electric flong dryers.

Brecomin (England), Ltd., Gads Hill, Gillingham, Kent. **F.74.**—Office dictating and electronic equipment.

British Astral Co., Ltd., The Chase, Bournemouth Park Road, Southend-on-Sea. **L.50.**—Electric cigarette lighters and electrical accessories.

British Ebonite Co., Ltd., Nightingale Road, London, W.7. **Earls Court R.15.**—



Baldwin "Ionex" ionization meter

Bowman "Magimix" mixer

Ebonite sheets, rods, tubes up to 9ft long; mouldings, polished ebonite and sections; also "Becolate" for hot climates.

British Electronic Products (1948), Ltd., Rugeley. **H.30.**—An electronic motor speed control equipment is seen in operation with other automatic control apparatus both high and low temperature radiation pyrometers, a high power stroboscope, a new alternator check synchronizer, new high speed scaling equipment, voltage regulation apparatus, photo-electric equipments, process timers, electrical protection devices, etc.

British Geon, Ltd., 21, St. James's Square, London, S.W.1. **Earls Court R.2. and R.33.**—Indications of the use in the electrical industry of the plastic raw materials made by this company and its associate, British Resin Products, Ltd., are given by examples of "Geon" p.v.c. covered cable and wire, "Geon" coated coils, "Rockite" for radio cabinets, "Cellomold" for telephone sets, "Epok" resins for insulating work, "Cellobond" for laminated tubes and "Distrene" for v.h.f. radio components.

British Heat-Resisting Glass Co., Ltd., Loxdale Street, Bilston. **Earls Court S.5.**—Technical glassware, low loss insulators suitable for l.v. and h.v. transmission lines, and radio transmission valves with envelopes and/or bases of "Phœnix" glass.

British Moulded Plastics, Ltd., Avenue Works, Walthamstow, London, E.4. **Earls Court R.2. and R.33.**—Moulded plastic products include television and radio cabinets and components for the electrical trade, in both thermosetting and thermoplastic materials.

British Optical & Precision Engineers, Ltd., 37, Mortimer Street, London, W.1. **C.95. and C.96.**—Products representative of G.B-Kalee, G.B. Equipments and Kershaw, include a new 16 mm arc lamp, the 8 mm "Screenmaster" projector and two examples of Gaumont-Kalee 35 mm projection and sound equipment.

British Resin Products, Ltd., 21, St. James's Square, London, S.W.1. **Earls Court R.2 and R.33.**—See British Geon, Ltd.

British Rototherm Co., Ltd., London, S.W.19. **C.72.**—This company is exhibiting a comprehensive range of bi-metallic and distance reading, easily read, dial type thermometers for both industrial and domestic use; also indicating and non-indicating temperature controllers, recorders and barometers etc. Of particular interest are a new heavy industrial bi-metallic thermometer for meeting conditions where more than normal vibration is present, and two recently developed mercury-in-steel non-indicating controllers in which the mercury switch is operated directly by a bourdon tube.

British Tabulating Machine Co., Ltd., 17, Park Lane, London, W.1. **F.27.**—Electric tabulating and accounting machines.

British Thomson-Houston Co., Ltd., Rugby. **C.106.**—With the B.T.H. 16 mm sound-film projector and "Mazda" lamps for photographic purposes, are large photographs illustrating outstanding features of the "Supa" (single unit projection assembly) cinema projector.

British Vacuum Cleaner & Engineering Co., Ltd., Leatherhead. **F.79, H.35, J.322 and Earls Court Y.2.**—"Goblin" and "Magneta" clocks, including domestic and

large wall clocks, master and slave clocks and time recorders are shown on stand F.79. On stand H.35 are the "Goblin Time Spot" radio, "Magneta" public address equipment, while the "Goblin Teasmade" automatic tea-making outfit, the "Lumilarm," combined bedside lamp, alarm clock and ashtray switch, and electric clocks in various attractive designs and finishes can be seen on J.322. At Earls Court domestic vacuum cleaners include both upright and cylinder models and a selection of industrial units.

J. & F. Brooks, Ltd., 50-54, Shudehill, Manchester, 4. **L.82.**—Table lamps, etc.

S. G. Brown, Ltd., Shakespeare St., Watford. **C.81.**—Echo sounders, course recorders, precision motors, cinema projectors, headphones, microphones, etc.

Brown's Clipper Co. (1939), Ltd., Electric Avenue, Birmingham, 6. **D.47.**—Electric toilet clippers.

Bylock Electric, Ltd., South Street, Ponders End. **Earls Court Y.10.**—Special attention is drawn to hedge cutting (illustrated) and paint spraying equipment. The "President" vacuum cleaner and the "Minivac" hand type cleaner are new items shown with the "Triplex" and "Classic" cleaners and floor polishers. Hair dryers and hand dryers are on view.

C.M.C. (Switchmatic), Ltd., North West House, West Street, Brighton. **H.23a.**—The "Switchmatic" radio remote control unit, the "Bella" extension loudspeaker, the "Brighton" new tone speaker and the "Carlton" table lamp speaker are shown.

Champion Electric Cpn. (C.R.V.T.C., Ltd.), Champion Works, Seaford. **H.34.**—"Elecookers," kettles, fires, irons, coffee percolators, boiling rings, switches, plugs, junction boxes and other accessories.

Chance Bros., Ltd., Smethwick. **C.32 and Earls Court S.11.**—Optical glassware and cathode ray tubes.

Chilton Electric Products, Ltd., Hungerford, Berks. **J.117.**—In addition to new models of the "Buk" electric razor, examples of the "Atlas" h.r.c. miniature circuit breakers (illustrated) and earth leakage trips are displayed.

Cinema-Television, Ltd., Worsley Bridge Road, London, S.E.26. **C.16.**—A 50 c/s noise suppression filter has now been fitted to the standard electronic metal detector to enable the instrument to be used near power cables, and various new models have been introduced including a special veterinary unit. An industrial model for locating minute pieces of ferrous or non-ferrous metal in foodstuffs, etc. is demonstrated. Among instruments for research and laboratory use are a universal valve tester, an R.C. oscillator (illustrated), with a frequency range of from 10 c/s to 100,000 c/s, a microsecond counter chronometer, oscilloscopes, power packs, scalers, bridges and cathode ray tubes.

"Clyde Clocks" (British & Foreign Agencies), Ltd., 37, Colvend St., Glasgow, S.E. **J.321.**—Electric clocks.

E. K. Cole, Ltd., Southend-on-Sea. **C.52 and Earls Court R.2 and R.33.**—Instruments for research, medical and industrial application include a radioactive thickness gauge, the 1008 A linear amplifier, the 1009 A scaler, the 1033 A power unit, the 1037 A ratemeter, radiation monitors, a cathode ray oscillograph, a vibrating reed electrometer, a radio-isotope analyser and a range of isotope containers. Examples of communications and radar equipment are also displayed as well as compression and injection mouldings.

Columbus, Ltd., Capital Works, Wembley. **Earls Court Y.8.**—See Birmingham Section.

John Compton Organ Co., Ltd., Minerva Road, London, N.W.10. **H.23b.**—Two models of the latest "Electrone" electric organ are demonstrated.

Constructors, Ltd., Tyburn Road, Birmingham, 24. **F.44.**—Steel factory and office equipment.

Stanley Cox, Ltd., 11, Gerrard Street, London. **C.43.**—Ultra-short wave apparatus; infra-red, ultra-violet, galvanic, faradic and sinusoidal units, and other electromedical apparatus.

Crystalate, Ltd., Golden Green, Tonbridge. **Earls Court R.2 & R.33.**—Plastic mouldings and fabrications.

Dawe Instruments, Ltd., 130, Uxbridge Road, Hanwell, London, W.7. **C.18.**—The 1250 dynamic balancing machine incorporating a stroboscopic device indicates immediately the points at which weight correction is necessary. Two instruments have been specially designed for the textile industry, the "Stroboloom," a source of stroboscopic light enabling shuttle speed to be examined, and the "Drytester" electronic moisture measuring device (illustrated). Other types of stroboscopes can also be seen, together with a moisture-in-timber meter, the "Strobotuner" for musical instrument tuning, "Q" meters, wave analysers, pulse generators, universal impedance bridges, valve voltmeters, and wide-range oscillators.

Thomas de la Rue & Co., Ltd., 84-86, Regent Street, London, W.1. **Earls Court R.2 and R.33.**—See Birmingham Section.

Dunlop Special Products, Ltd., Birmingham, 24. **Earls Court R.16.**—Plastic sheet and extrusions; also adhesives.

Ebonestos Industries, Ltd., Excelsior Works, Rollins Street, London, S.E.15. **Earls Court R.2 & R.33.**—Plastic mouldings.

W. Edwards & Co. (London), Ltd., Allendale Works, Worsley Bridge Road, London, S.E.26. **C.56.** — High-vacuum rotary and diffusion pumps, compressors, measuring equipment and accessories are shown with special units for vacuum coating, freeze drying and vacuum sublimation.

Electrix, Ltd., Sterling Works, Dagenham, Essex. **Earls Court Y.6.**—The latest vacuum cleaner has a special undercarriage for use on stairs. A new light industrial sanding, polishing and drilling machine and the "Blanch-Electrix" butter maker have been designed for export only. Other items shown are an industrial sprayer, a floor polisher and the "Auto-Light" lighting set.

Electrolux, Ltd., 153-5, Regent Street, London, W.1. **Earls Court Y.5.**—See Birmingham Section.

Electronic Developments (Surrey), Ltd., 18, Villiers Street, Kingston-on-Thames. **N.3.**—Radio control units for model aircraft, etc.

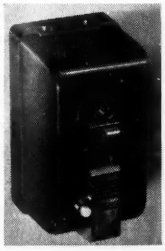
Electronics (Enfield), Ltd., 10, Bycullah Road, Enfield. **H.32.**—Intercommunication and staff location systems.

Elliott Brothers (London), Ltd., Century Works, London, S.E.13. **C.26.**—In addition to many of the instruments shown at Birmingham there is an electronic unit for the simultaneous display on one cathode-ray tube of the strain at ten different points in a test piece.

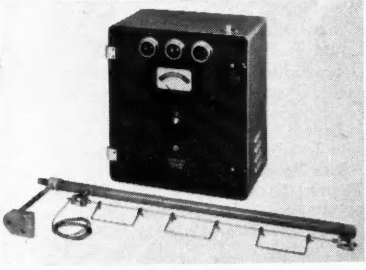
English Clock Systems, Ltd., 179, Great Portland Street, London, W.1. **J.302 & J.402.**—Commercial and industrial time-keeping equipment includes time recorders, bell control clocks and process timers.

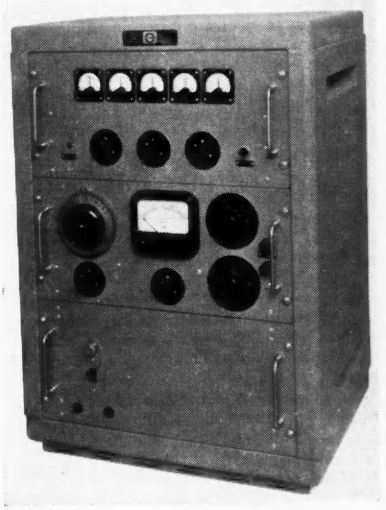
Erinoid, Ltd., Lightpill Mills, Stroud, Glos. **Earls Court R.2 & R.33.**—Plastic sheet, rods, tubes, etc.

Evans Electroselenium, Ltd., Harlow. **C.50.**—With the "Eel" selenium barrier layer photo-cells are a portable colorimeter for assessing the colour density of a liquid, a comparator for detecting minute differences between samples of whites and off-whites, a reflectance spectrophotometer, a universal densitometer and reflection head (illus. p. 899) for three-colour separation photographic work, and an absorptiometer for the colour measurement of liquids.



Chilton miniature circuit breaker





Top centre: Bylock hedge cutter. Above: "Cintel" R.C. oscillator and automatic frequency monitor. Left: Dawe Instruments "Drytester"

Everett, Edgcumbe & Co., Ltd., Colindale Works, London, N.W.9. **C.33.**—Indicating and recording instruments, test sets, photometers, relays, tachometers, timing motors, clocks, process control gear and special instruments.

Funditor, Ltd., 3, Woodbridge Street, London, E.C.1. **Earls Court T.9.**—See Birmingham Section.

G.B. Equipments, Ltd., 37-41, Mortimer Street, London, W.1. **C.95 and C.96.**—See British Optical & Precision Engineers, Ltd.

General Acoustics, Ltd., 122, Wigmore Street, London, W.1. **C.85.**—See Acousticon.

General Lighting Equipment Co., Ltd., 99, Great Eastern Street, London, E.C.2. **Earls Court X.16.**—Lighting fittings and torches.

Gestetner, Ltd., Aldwych House, London, W.C.2. **F.25 and F.29.**—Controlled inking by vacuum pump is a feature of the "160 Express" electric duplicator.

Louis S. Glass & Co., Ltd., 49, Greek Street, London, W.1. **L.55.**—Electric table lighter.

Gledhill-Brook Time Recorders, Ltd., Empire Works, Huddersfield. **F.39 and F.54.**—Time recorders.

Graham Farish, Ltd., Mason's Hill, Bromley, Kent. **N.30.**—Electric pumps, fires, floodlights and electrical components.

Grimshaw, Baxter & J. J. Elliott, Ltd., 29-37, Goswell Road, London, E.C.1. **J.302. and J.402.**—Electric clocks.

Hadley Sound Equipments, 587-9, Bearwood Road, Smethwick. **F.91.**—Operated through an automatic exchange of unique design, the new "Multicom" intercommunication system gives instant contact, either by loudspeaker or hand telephone, between every point.

Hanovia, Ltd., Bath Road, Slough. **C.45.**—Ultra violet apparatus for scientific, medical and technological applications; fluorescence analysis laboratory lamps; "Alpine Sun," "Centrosol," Kromayer medical lamps; air sanitation discharge tubes; and "Sollux" infra red lamps.

Hervey & Goodman, Ltd., 93-97, Regent Street, London, W.1. **Earls Court O.13.**—Changing colour electric signs.

Hilger & Watts, Ltd., 48, Addington Square, London, S.E.5. **C.58.**—With two new instruments, a wire-drawing-die profilometer and a horizontal type measuring machine are a circular division tester, engineers' precision block levels, clinometers, microscopes, and precision scales. Other engineers' measuring instruments are shown at Birmingham by Albert Herbert, Ltd.

H. C. Hiscock, 153, Kings Road, London, S.W.3. **L.84.**—Lighting fittings, floodlight reflector stands, etc.

Oswald Hollmann, 208, Kent House Road, Beckenham. **L.63.** — Lighting fittings.

Hoover, Ltd., Perivale. **Earls Court Y.1.** —The new heavy-duty cleaner model 912 has been specially designed for use in hotels, cinemas, public buildings, etc. Domestic models include the standard model 612, the "Junior," the cylinder model 402 and the "Dustette" models. The company's electric washing machine is also displayed.

R. F. Hunter, Ltd., 51, Gray's Inn Rd., London, W.C.1. **C.94.**—Projectors, "Metrovick" exposure meters, etc.

Hyders, Ltd., The Ironworks, Plaxtol, near Sevenoaks. **L.30.**—Wrought-iron lighting fittings, include chandeliers, floor standards, table lamps (illustrated), lanterns and wall brackets.

Imperial Chemical Industries, Ltd., (Plastics Division), Black Fan Road, Welwyn Garden City. **Earls Court R.11 & R.23.**—Applications of plastics in the lighting and electrical fields are emphasized. The injection moulding of "Alkathene" is demonstrated.

Insulators, Ltd., Leopold Rd., London, N. 18. **Earls Court R.2 & R.33.**—Plastic mouldings.

International Time Recording Co., Ltd., Beavor Lane, London, W.6. **F.71.**—Included among a display of master and secondary clocks, a motor-driven turret clock movement, a bell ringing control cabinet and staff signalling apparatus is the "Superelectric" card time recorder (illustrated) designed for one-hand operation, the machine not the operator selecting the position for the record. It is designed to control time signals automatically.

Johnson, Matthey & Co., Ltd., Hatton Garden, London, E.C.1. **B.40 and Earls Court S.13.**—The electrodeposition of silver and rhodium is typical of the many applications of precious metals to industry.

Kego Electric Co., Ltd., Mount Pleasant, Wembley. **L.105.**—Lighting fittings.

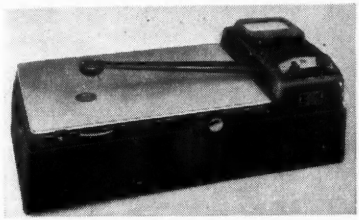
Kent Mouldings, Footscray, Kent. **Earls Court R.2 & R.33.**—Industrial mouldings.

La Reine Hair Waver & Curler Co., Ltd., 106, Upper Tooting Rd., London, S.W.17. **D.13.**—Radiant heat lamps, etc.

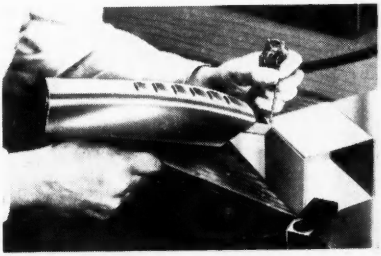
Lectron Hearing Aid Co., 116, Victoria St., London, S.W.1. **C.80.**—Hearing aids.

Lee Products (Gt. Britain), Ltd., 90, Gt. Eastern St., London, E.C.2. **H.33.**—Radio apparatus, switches, transformers, etc.

Magneta Time Co., Ltd., Goblin Works, Leatherhead. **F.79, H.35 & J322.**—See British Vacuum Cleaner & Engineering Co., Ltd.



"Eel" universal densitometer (Evans Electroselenium) and (right) "Superelectric" time recorder (International Time Recording Co.)



Mullard ultrasonic soldering iron (above) and Hyders wrought-iron table lamp (left)

Maple & Co., Ltd., 149, Tottenham Court Road, London, W.1. **Earls Court 0.34.**—"Wonder Glow" signs, which have a loading of only 5 W per tube, can be manufactured in either single or composite units, with lettering of any type. Also displayed are "Barlux" architectural lamps and neon tubing and transformers.

J. & A. Margolin, Ltd., 112-116, Old Street, London, E.C.1. **H.27a.**—Most of this company's "Plus-a-Gram" record players and radio-gramophones incorporate minor technical improvements.

Measuring Instruments (Pullin), Ltd., Winchester Street, London, W.3. **C.15.**—Besides rectangular and circular measuring instruments there are on view the series 100 multi-range radio test set and portable sub-standard dynamometer instruments. The new type PD.440 a.c. dynamometer testing set combines the functions of a precision ammeter, voltmeter and wattmeter.

Megatron, Ltd., 115a, Fonthill Road, London, N.4. **C.30.** — Selenium photo-electric cells and photo-electric apparatus.

Mellor Mineral Mills, Ltd., Etruria Vale, Stoke-on-Trent. **B.11.**—Electrical porcelain is among this company's products.

Mentmore Manufacturing Co., Ltd., 3, Thornhill Road, Islington, London, N.1. **Earls Court R.35.**—Mouldings for the electrical and radio industries.

Metamec, Ltd., South Green Works, Dereham, Norfolk. **J.314.**—Electric clocks.

Mica Products, Ltd., Golden Green, Tonbridge. **Earls Court R.2 and R.33.**—Moulded products including bobbins and formers; and "Micanite" components.

G. B. Montgomery Mfg. Co. (Glasgow), Ltd., Montrose Avenue, Hillington, Glasgow. **C.93.**—Electronic photographic flash equipment.

Moulded Components (Jablo), Ltd., Mill Lane, Waddon, Croydon. **Earls Court R.18.**—"Jablex" plastic materials.

Mullard Electronic Products, Ltd., Century House, Shaftesbury Avenue, London, W.C.2. **C.69.**—A comprehensive display of valves covers general-purpose valves, battery and mains sub-miniatures, v.h.f. valves, industrial thyratrons, industrial photocells, stabilizers and voltage reference tubes, electrometers, instrument cathode ray tubes and electronic flash tubes. Two

Photax hotplate for photographic work and (right) Pullin Optical Co.'s exposure meter

new photocells not much larger in diameter than an ordinary pencil are particularly suitable for extremely small lens systems, and a miniature gas-filled tetrode is available for thyratron applications where the space saving is important. Sub-miniature electrometers are shown in portable dosemeters for measuring radioactive emissions, while sub-miniature valves for use in communications and industrial electronic apparatus are on view for the first time. Among electronic equipments is a new l.f. magnetostriction ultrasonic generator; and an ultrasonic soldering iron (illus. p. 899) suitable for metals which form refractory oxide films, a conductivity bridge for carrying out routine conductivity tests on boiler water condensates, etc.; a new h.f. oscilloscope; and a new viscometer.

New Welbeck, Ltd., 94, New Bedford Road, Luton. **Earls Court Y.4.**—Vacuum cleaners.

Office Machinery, Ltd., 3, Vere Street, London, W.1. **F.48.**—Electrical equipment for offices.

"Ossicaide," 1, Upper Richmond Road, London, S.W.15. **C.67.** — The "Osray R.P.14" is claimed to be the world's smallest hearing aid.

John Perry & Co. (Plastics), Ltd., 105, Baker Street, W.1. **Earls Court V.8.**—The "Cheeto" mixer can be removed from its stand for mashing potatoes in the saucepan, etc. Besides two "thick mix" heads, two bowls, a drink mixer, a silver polisher and a plastic dust cover are provided.

Photax (London), Ltd., 70, Charlotte Street, London, W.1. **C.104.**—The new "Major Flexolite" table lamp is larger than the standard type and takes a 100 W bulb. A special hot-plate (illustrated) for photographic work is another product.

Pifco, Ltd., Watling Street, Manchester, 4. **C.82.**—A hairdryer, a heat massager, and an infra-red and radiant heat unit, a mains-operated nursery lamp and the novelty "Pistolite" torch are of special interest. The "Pifco Fairylight" decoration set and the "Dualite" lantern are also displayed on this company's stand.

R. B. Pullin & Co., Ltd., Great West Road, Brentford. **C.92.**—Electrical instrument motors include a low-voltage square-bodied range designed for aircraft and similar instruments where great power is required with small size and weight. Electrical turn and slip indicators give a degree of sensitivity unsurpassed in a gyroscopic instrument. Low-voltage heavy-duty multipole relays for 12 or 24 V d.c. have a consumption of less than 5 W.

Pullin Optical Co., Ltd., Great West Road, Brentford. **C.92.**—A new photographic exposure meter (illustrated) can be clipped to a wrist-strap.

"Q-Max" (Electronics), Ltd., 10, Little Turnstile, London, W.C.1. **H.39.**—Radio transmission and reception apparatus, measuring instruments, etc.

Richard Quinnell, Rowhurst Works, Oxshott Road, Leatherhead. **L.38.**—With hand wrought-iron chandeliers, wall brackets, floor and table lamps, etc., are lampshades made from old manuscripts, maps, calf skin, silk damask and other materials. Wrought-iron clocks are also displayed.

Reads & Barrons Mixers, Ltd., 260, Kilburn Lane, London, W.10. **Earls Court V.16.**—Cake mixers and dough kneaders for bakers, confectioners, etc.

Sangamo Weston, Ltd., Great Cambridge Road, Enfield. **C.77.**—See Birmingham Section.

Scientific Instrument Manufacturers' Association of Great Britain, Ltd., 17, Princes Gate, London, S.W.7. **C.19 and C.31.**—The central feature of the members' composite exhibit is again a display by the Ministry of Supply on developments in atomic energy.

Scophony-Baird, Ltd., Wells, Somerset. **C.10.**—New instruments of special interest are a stroboscope operating in two ranges over a flash frequency range of from 200-

6,000 flashes per minute, dynamic balancing machines, fatigue testing machines, operating with temperatures up to 800 deg C, magnetic tape recorders for commercial and home use, a 7½ in 4-bladed fan designed primarily for the export market, and hermetically sealed and open type transformers.

Scott, Bader & Co., Ltd., 109, Kingsway, London, W.C.2. **Earls Court R.2 and R.33.**—"Marco" thermosetting resins for electrical component embedding, etc.

Sheffield Smelting Co., Ltd., Royds Mill Street, Sheffield, 4. **J.237.** — Plating anodes, thermocouple wires, etc.

E. Shipton & Co., Ltd., Ferndown, Northwood Hills, Middlesex. **F.27.**—A special feature is made of "Interchief" and "Intercall" telephone systems, the former being suitable for offices and works, the latter for hotels, flats and private residences. The "Intercall" telephone system is claimed to be completely unbreakable.

Simon Sound Service, 48-50, George Street, London, W.1. **H.24.**—Recording equipment, amplifiers, etc.

Smith's English Clocks, Ltd., "Sectric House," Waterloo Road, London, N.W.2. **J.302 and J.402.**—Electric clocks, time recorders, process and industrial timers, tower clocks, bell control clocks, etc.

Solus-Schall, Ltd., 39a, Welbeck Street, London, W.1. **C.16.**—X-ray apparatus for medical and industrial purposes; electromedical apparatus.

Southern Instruments, Ltd., Fernhill, Hawley, Camberley, Surrey. **C.44.**—Oscillograph recording equipment includes a single-channel mobile unit taking either continuous feed or drum records and particularly suitable for engine indicating work. Special attention is drawn to "Mincrack" drift-corrected direct-coupled amplifiers.

Speights, Ltd., Mill Road, Dewsbury. **L.81.**—Lamps and shades in all materials.

Standard Telephones & Cables, Ltd., Footscray, Kent. **F.12.**—Private telephone systems, loudspeaking telephones, staff signalling systems, fire alarm systems, suppressors, totalisator installations and radio-frequency heating equipment.

Synchronome Co., Ltd., Abbey Electric Clock Works, Woodside Place, Mount Pleasant, Alperton. **J.331.**—Electric clocks, watchman's tell-tale clocks, time recorders, precision instruments for observatories and industrial time equipment.

Taylor Electrical Instruments, Ltd., 419, Montrose Avenue, Slough. **H.38.**—Radio test equipment and measuring instruments.

Henry E. Taylor, Ltd., Queensway, Ponders End. **Earls Court Y.3.**—"Hetco" floor polishers, scrubbing machines, vacuum cleaners and hairdryers are products shown.

Thermionic Products, Ltd., Morris House, Jermyn Street, London, S.W.1. **F.99 and H.26.** — The "Recordon" magnetic-electronic dictating machine records on paper discs which can be folded, mailed, filed and played back at any time. The "Soundmirror" magnetic tape recorder gives a full half-hour's recording on every reel of tape.

Thermo-Plastics, Ltd., Luton Road Works, Dunstable. **Earls Court R.29.**—Components for the electrical and allied industries manufactured from laminated glass fabric in various forms are an innovation. In addition there are examples of mouldings.

Truvox Engg. Co., Ltd., Exhibition Grounds, Wembley. **Earls Court Y.9.**—"Juno" domestic and "Oco" industrial floor polishers and other domestic appliances, including irons, kettles and fires.

20th Century Electronics, Dunbar Street, London, S.E.27. **C.42**—Cathode ray and Geiger counter tubes.

Universal Plastics, Ltd., Brook Road, London, N.22. **L.60.**—Moulded components for the electrical and radio industries.

Vactric, Ltd., Newhouse, Motherwell. **Earls Court Y.7.**—Vacuum cleaners, floor polishers and waxers, and a new combined food mixer, all-purpose hand polishing machine and portable hand tool.

Victoria Instruments, Midland Terrace, London, N.W.10. **C.60.**—Electrical measuring instruments.

Viscose Development Co., Ltd., Woldham Rd., Bromley, Kent. **D.15.**—"Viskring" cable markers.

Waite & Son, Ltd., Menin Works, Bond Rd., Mitcham. **L.25.**—Lighting fittings.

Wallington, Weston & Co., Ltd., Vallis Way, Frome. **Earls Court R.5.**—"Sondahl" insulating material.

Warm-Glow, Ltd., 1133, London Rd., Leigh-on-Sea. **C.88.**—Electric blankets, soil heating cables, thermoplastic extrusions and moulded components.

Whiteley Electrical Radio Co., Ltd., Victoria Street, Mansfield, Notts. **H.28.**—Among "Stentorian" loudspeaker units the concentric duplex model is given special prominence. A radiosonde transmitter is also shown, together with radio valveholders, transformers, chokes and switches.

Woden Transformer Co., Ltd., Moxley Road, Bilston. **H.30.**—Transformers and chokes for radio and television equipment include a range developed specially for export. Among power transformers of up to 350 kVA are new constant voltage units up to 5 kVA and a saturable reactor for stage lighting control. A radio amplifier has been designed for educational purposes.

ELECTRICITY IN MINES

Need for Effective Training to Avoid Accidents

THE Ministry of Fuel and Power has just announced the availability of the report of H.M. Electrical Inspector of Mines (Mr. G. M. Harvey) for 1948, copies of which can be obtained from H.M. Stationery Office, price 6d. During the period covered by the report 873 inspections were made of which 324 covered surface equipment, 290 both surface and underground plant, and 259 underground only. In addition to this 29 inspections were made at metalliferous mines and 268 at quarries.

The increasing use of electrical equipment in mines is indicated by the fact that the installed capacity of electric motors rose by 3.44 per cent over the previous year's figure to 2,848,486 h.p., representing 34,581 motors on the surface and 46,963 underground. This increase represents the use of 257 more motors for coal-cutting, 1,244 for conveying and loading and 694 for other portable machines.

Unscreened Trailing Cables

There were three fatal accidents during the year, all below ground, and in each of two cases a man was killed by electric shock while dragging a conveyor trough across an unscreened trailing cable. In the third case the victim received fatal injuries and seven other men were burned. In addition, 57 persons were injured in 61 non-fatal accidents and dangerous occurrences, ten of which happened on the surface and were due to electric shock. Of the 51 underground accidents, 43 were due to electric shock or arc burns, one to an ignition of firedamp, six were fires causing no personal injury and one was due to "eyeflash."

Trailing cables were responsible for two fatal and 12 non-fatal shock accidents, one ignition of firedamp and two fires. Both fatal accidents, 11 non-fatal shock accidents and both fires were directly due to damaged unscreened cables. Trailing cable plugs were responsible for three accidents and the inspector emphasizes the danger of filing the surface of the insulator block of a B.S. plug to make it more readily removable. The insulating properties of these blocks lie mainly in the polished surface and once this is removed the insulator can absorb moisture and is far more subject to "tracking."

Twenty-Year Review

In a review of the total number of electrical accidents during the period 1929-1948 it is shown that whereas the horse-power has increased by 62.5 per cent, fatal accidents have fallen by about 45 per cent. Against this there was a rise of 28 per cent in the non-fatal accidents, resulting in a net rise of 17 per cent in the combined total. Shock, with which is included arc burns, accounts for the greater proportion of accidents, though more than twice as many persons were killed by ignitions of firedamp in one-third as many individual accidents.

It is shown that trailing cables and plugs were responsible for 45 per cent of the fatal and 35 per cent of the non-fatal accidents and it is safe to say that at least 80 per cent of the cables involved were unscreened. Switchgear comes second with 19.5 per cent and armoured cables third with 10.25 per cent, and in the case of the former, the accident is not generally due to the design or unsuitability of the apparatus but to carelessness or foolhardiness on the part of the person repairing or adjusting it.

The increase in the number of electricians involved in non-fatal accidents amounts to no less than 140 per cent. Whereas the increase in horse-power has only been 62.5 per cent, the horse-power of coal-face machinery has quadrupled, but the increased exposure to risk is not enough to account for the rise in the number of accidents.

In conclusion, the inspector shows that 26 per cent of the shock accidents and 49 per cent of the fires were due to defective installation or maintenance. Furthermore, 63 per cent of the shock accidents and 36 per cent of the fires are attributed to misuse, negligence or ignorance, the only answer to which is effective training.

ELECTRICAL CONTRACTING: Organization and Routine

By H. R. TAUNTON, A.M.I.E.E.

2—*The Office Staff*

IN a "one-man" firm the principal may be practically the whole of the staff. In one, however, such as we have to consider for the purpose of illustration, in which every department has at least one salaried representative, the principal can be a freelance. Generally he will leave each department to its head and devote himself as a supernumerary to whichever he thinks he can best assist. He may spend most of his time out of doors, in touch with his various contracts; or he may devote himself to the getting of new inquiries by the cultivation of his personal connection.

What applies to a single principal applies to two or more partners. They will either displace or supplement the work of one or more heads of departments, according to individual taste and aptitude; or one will look after certain contracts, and another, others. Each will have a personal connection of his own, and will naturally take a special interest in inquiries and orders emanating from it.

Second in Command

The standing of the second in command depends on what and how much the principal undertakes himself. If he is his own manager, all the heads of departments will theoretically be on a level, none with authority over the other. In practice, however, one of them, generally a technical man, will nearly always, either by his capabilities or by mere long service, rank as chief. Every firm should have some such recognized head of its staff, particularly if there is only one principal. He needs a capable understudy, not merely to maintain discipline in his absences, but to take responsibility when those absences are prolonged by holidays or by sickness.

Those principals who prefer to concentrate on one particular side of the business, or those others who, for one reason or another are unable to devote all their time to it, will employ a man who is definitely the manager. He will have authority over all the staff, indoor and out, and be responsible for all the details of the organization. He will, in fact, be practically in the position of a man running his own business, except that he will have to leave for discussion with his employer all points of general policy and any major issue which may affect the well-being of the firm.

The Manager's Status

In any business the status of the manager is not so much that of an employee as the employer's representative. For that reason he is the one man whom it is practical and desirable to remunerate by some form of profit-sharing. Most schemes of profit-sharing, plausibly as they read on paper, break down in practice because they do not provide sufficient incentive for the junior members of the staff, who cannot directly control them and have to take their results on trust. The manager, on the other hand, has both knowledge and control of the profit-making machinery and, if part of his remuneration depends thereon, will naturally make it work at its best efficiency.

The manager of a contracting firm is worth the best remuneration its turnover can afford him, for he must be a man of many accomplishments. He must above all things be a good organizer and disciplinarian, able not only to plan on paper a detailed scheme of office machinery and duties, but capable of enforcing it. A manager, and for that matter, a departmental head, is not expected to do routine work; but he must know how it is done, and be able to detect at once if it is done badly or neglected.

If there is a chief engineer, apart from the principal or manager, he is generally the next most important member of the staff—since electrical contracting is essentially an engineering business. He will usually have had at some time an ortho-

dox technical training; but he is first and foremost a practical man, much of his technique that of the trade catalogues, and much again rule of thumb, amended daily particularly where labour constants are concerned; all essential to him, but not to be gained in any technical institute.

A proportion of his work will be straightforward estimating to cut-and-dried specifications; but he will often be called upon to prepare his own schemes and specifications. His specialized knowledge, therefore, must be wide and up-to-date. His firm should provide the leading electrical journals for the use of the technical staff so that they may keep abreast of any developments which may affect their practice, as well as a small but comprehensive reference library.

The engineer will also be responsible for the general supervision of contracts in hand; so that a proportion of his time will be spent out of the office, and perhaps in travelling. He has, in fact, to see the jobs through from their first inception as a "firm" inquiry to their completion. His is the responsibility of ensuring that the final cost does not exceed his estimate and on his efficiency depends, probably more than on that of any other member of the staff, a favourable balance in the annual profit and loss account.

Delegation of Duties

In a largish firm he will have one or more assistants. The engineer's assistant is, or should be, the future engineer. He should therefore have all the qualifications of his chief apart from the longer experience. His job will have more of routine in it, but if the engineer is wise he will do what he can to train him in habits of self-confidence and responsibility; as, for instance, by allowing him to prepare the whole of a certain estimate or handing over to him the management of some of the more straightforward jobs, with a watchful eye but as little interference as possible.

Little need be said of the draughtsman. Not many firms can employ a whole-time man on the drawing-board, and usually the work is part of the duties of the engineer's assistant. Any contractor's engineer, senior or junior, should be able to execute satisfactorily the comparatively few and simple drawings the average business requires. All that is demanded of him is that he shall be able to translate rough sketches into neat diagrams, make tracings, mark up plans, and occasionally turn out a dimensioned drawing of an engine-room lay-out or a switchboard.

The Supervisor

The only other member of the technical staff to be considered is the supervisor, whose intensive supervision is additional to any which the principal may, and the engineer must, give to at least the larger contracts. He is usually a promoted foreman who has shown special aptitude for organization and the handling of men.

Like a sergeant-major, he provides a valuable liaison between the principal and his engineers—the officers— and the foremen and men—the "other ranks." He is himself one of the office staff, with fixed salary and staff privileges and on the job he is his employer's representative. At the same time, he is an ex-workman. He has the appreciation of experience for the workman's mentality, which the seniors of the staff have never had or have long lost. In close touch with the men, his eyes and ears open for brewing trouble over working conditions, he is able to sound their feelings on any modification of them which may be desirable. Thus, whether by the firm hand or tactful compromise, he can nip discontent in the bud or avert its possibility. No wise employer will venture on any step affecting his labour, however well within trade union regulations it may appear, without discussion with his supervisor.

The efficient supervisor has a large influence on the firm's prosperity. He spends practically the whole of his time on the various jobs. He will spot the little bit of scamped work which might be buried out of sight before the "boss's" more hurried inspection, and individual instances of "wangling" or "swinging the lead," attempts to spin out a job or employ unnecessary labour on it. In any case, even if good foremen can be relied upon for that, his supervision is necessary for the many one- or two-pair jobs, repair and maintenance.

Apart from his experience, the supervisor's chief asset is his character. Above all, he must be firm. Easy-going amiability is a pleasant trait in humanity at

large, but the man who is trying to squeeze a profit out of the labour on an electric l contract has no room for it. What l e has of it in him must be kept for home consumption. Nothing should be don by his chiefs that might weaken his aut ority. No order of his should be directly countermanded. If his chiefs think it necessary to reverse or amend it, they should leave him to do it in his own way so that his prestige is maintained.

Representative's Qualifications

The outside representative's job is one which requires a rare combination of qualities. He must have technical knowledge sufficient to enable him to talk intelligently on his subject, to give, when necessary, approximate prices, and to take ordinary quantities for the information of the estimating department. At the same time he must have the modesty and prudence to know his limitations, so that he will not rashly commit his firm to obscure and hazardous undertakings.

He should be something of a draughtsman, able to read and mark up a plan correctly or to get out a rough one himself; able, too, to take tracings and, on occasion, to make a clear freehand sketch. He must be in touch with modern advances in electrical installation work and he should be acquainted with general catalogues and prices.

A forceful personality is, perhaps, the chief essential in his make-up, the precious talisman which will carry him past the outer defences of office-boy or typist to speech with a principal. Energy and enterprise, method, flexibility, probity, and courtesy are other qualities of the ideal representative. He must be well dressed, and should be of good appearance, with a cultured diction. Finally, not to tabulate all the characteristics of an Admirable Crichton, he must be of more than ordinary sociability. And a certain conviviality is practically inseparable from his calling; so much so that, unfortunately, carried to excess, it has been the ruin of many an otherwise good man.

As we are taking for illustration a firm which is not a limited liability company the chief member of the non-technical staff will be the accountant or bookkeeper. He will usually also be the cashier. He should have the ordinary virtues and accomplishments of his calling, but he should also have sufficient of elementary technics to save him from writing nonsense in drafting an ordinary account.

In addition to keeping the usual set of books, preparing accounts with or without technical assistance, he will handle incoming and outgoing moneys, have charge of petty cash, and make out the weekly wages list and pay envelopes. In this connection he must be conversant with the local working rules, particularly as to pay, overtime, country-money, and allowances. Finally, he will be responsible for the costing system, special work which is certainly supplementary to that usually required of a commercial accountant, but which calls for no special ability beyond common sense and accuracy. He will, perhaps, have a couple of assistants, one of whom will keep the cost-ledger, under his supervision, generally a whole-time job but well within the competence of an intelligent junior. The other may be little more than an office-boy, who will be more or less at the disposal of the whole staff.

Junior Office Staff

There will usually be at least two typists dividing between them the work of correspondence, copying and filing, with perhaps a junior to look after the telephone, address envelopes, keep the stamp-book, and so on. The difficulty in engaging a typist from an outside source is in getting one who, in addition to the common standards of stenography, has sufficient familiarity with electrical phraseology to keep her from transcribing the engineer's technicalities into balderdash. And by the time she has been taught to distinguish her outlines for "plugs" and "blocks," or "insulation" and "installation," she will, being too often a bird of passage, leave for a "better" job—a less strenuous one.

An intelligent girl who can be persuaded to take an interest in her work may become that ideal the harassed employer is always looking for and so rarely finding: not the mechanical typist, but the capable secretary.

To complete this summary of an average staff, we should mention the storekeeper and his underlings: one or two assistants and a boy. They and their

functions, however, will be fully discussed in a later article.

It will be seen, then, that an average firm will probably have a staff of a dozen or fourteen. Larger firms will have further assistants to the various representative grades smaller firms will merge their functions, until we get down to the irreducible "Pooh-Bah" of the "one-man" firm. The nice proportion of the correct number to the average turnover requires careful judgment. An electrical contracting business is subject to slight seasonal and serious periodical fluctuations, so that at times the staff may not be fully occupied and at others may be overworked. Either condition, long continued, is demoralizing.

Retention of Employees

To meet these inevitable fluctuations two courses are open to the employer. He may cut down his staff when times are bad, replenishing it as they improve. He will naturally select for dismissal the weaker members of it which, of course, he could do at any time. On every other score fortuitous dismissals are to be avoided. Nothing so fosters the important factor of loyalty as the assurance of permanence, the feeling that an employer will do all he can to keep his long-service men together, even at some reasonable sacrifice of immediate profits.

The alternative course is in every way preferable; but it is certainly less easy. Having once determined how many should compose a staff that will meet the demands of normal trading, extra pressure of work can be met by the engagement of temporary assistants. Their dismissal when reaction sets in again will be no special hardship to them, as they will be prepared for it while the members of the permanent nucleus will be quick to appreciate that they themselves are in no danger of following them.

The importance of satisfactory conditions to the smooth running of a firm's organization, with the resultant very definite effects on its profits cannot be stressed too heavily. Chief among these is, of course, the question of remuneration. Many employers would be the better for a little imagination on this point. They think, or rather, take it for granted without thinking, that their employees should be as keenly interested as they in everything that can affect the firm's profit. Man is a selfish animal, and the most loyal employee is interested primarily in what he himself is getting by his work, not in what the firm is getting by it. That, if they are loyal, will be an interest, but it will always be a secondary one. The more fully their own interests are satisfied the freer they are, and the more likely to consider those of the firm which satisfies them.

The moral is clear. Pay the employee of proved ability a generous wage, one that will satisfy him and bind him to you. If you can give him something more than the average market value of his job, so much the better. What you lose in increased standing charges will be more than made up to you by freedom from the dislocated organization which follows frequent changes of staff.

Next in importance is the question of hours. The employer who complacently sees his office staff regularly working over hours is not giving them a square deal. He should either increase his staff or revise his organization. Quite rightly he insists on good time-keeping at the beginning of the day; they have as much right to insist on it at the close, to resist systematic encroachment on their leisure.

Holidays are an essential recuperation of exhausted energies. Their real drawback from the employer's point of view is the dislocation of routine they involve, but this will be minimized if members of the staff have been trained to understudy their immediate superiors.

Other working conditions necessary to the well-being and efficiency of a staff have already been mentioned in discussing the question of office accommodation: light, air, warmth, reasonable comfort and pleasant surroundings.

The Personal Touch

As important are the less tangible amenities depending on the employer's personality. A kindly but unobtrusive interest in his employees as individuals and not as mere robots, evincing itself on occasion, perhaps in times of illness or trouble, in little generosities; tact and discrimination tempering just discipline; a word of praise when it is fairly earned: thus is fostered loyalty and willing service. But it is not to be taught to the man who needs to be taught it.

Commerce and Industry

Research Mechanics Required
Increased Road and Rail Charges

MECHANICS with a flair for experimental work are being sought by the Ministry of Supply to fill posts in the Sellafield, Cumberland, factory of the Ministry's Atomic Energy Production Division. Men needed by the Windscale Works at Sellafield are those experienced in assembling or repairing recording instruments using electrical, pneumatic and other methods. They are wanted for research and experimental work. Qualifications for the posts are apprenticeship served in instrument engineering or radio, radar or electrical engineering. Equivalent experience or courses taken in the Forces would also be suitable. Inquiries from radio enthusiasts for work on electronics will also be welcomed by the Ministry. They must, however, have sound theoretical knowledge and be educated up to School Certificate standard. Inquiries should be sent to the Superintendent, Windscale Works, Sellafield, Cumberland.

Motors for America

Newman Industries, Ltd., of Yate, near Bristol, made its initial shipment of electric motors to the United States on 26th April. The North American market called for a new range of electric motors to be specially designed to meet requirements of standardization (N.E.M.A. standards) for the United States and Canada, and Mr. A. J. Newman, chairman of the company, visited North America and worked on the problem until it was overcome. The availability of this American type electrical equipment will also be a useful aid to British machine tool and other machinery manufacturers who are endeavouring to increase their sales in North America. Mr. A. J. Newman states that his company anticipates that this latest development in its export programme and shipments to Canada and the United States will result in sales of electrical equipment totalling several million dollars per annum.

The first consignment of Newman motors for the United States leaving the company's works at Yate, Bristol

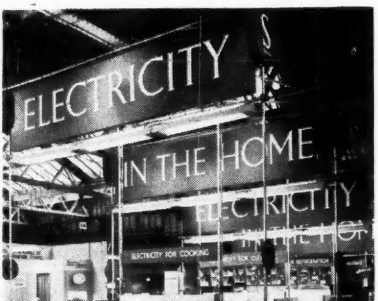
Contract Price Adjustment Formulæ

The following are the latest figures for use in the B.E.A.M.A. contract price adjustment formulæ. The rate of pay for adult male labour at 8th April is deemed to be 115s (unchanged). Costs of materials: the Board of Trade index figures for intermediate products as on 8th April is 278.1, and is the figure for March (against 277.3 for February).

Higher Transport Charges

As a result of the addition of 9d per gallon to the tax on petrol and fuel oil, combined with the imposition of a 33⅓ per cent purchase tax on new commercial vehicles, the Road Haulage Association has advised its members to increase all haulage rates by 10 per cent. The Association claims that its members operate 120,000 vehicles under "A" and "B" licences.

The Minister of Transport announced in the House of Commons on 27th April that the Government had decided to authorize the British Transport Commission to make the increase of 16⅔ per cent on railway freight charges recommended by the Trans-



The stand of the South East Scotland Electricity Board at the recent Edinburgh Modern Homes and Health Exhibition

port Tribunal as well as the proposed increases in dock and shipping charges. Mr. Barnes said that the effect upon the price of coal would be negligible in some places, but in areas remote from the coalfields it might result in increases of from 1s to 4s a ton.

An announcement by the Iron & Steel Federation stated that the new freight charges would add 10s a ton to the cost of steel, and prices would have to be reviewed within the next two or three weeks.

Protective Gear Courses

Two courses on the planning and operation of protective gear have been arranged by the British Electricity Authority for engineers in the electricity supply industry. These courses, which are to be organized by the College of Technology, Manchester, will be held at Electricity Hall, Buxton, from 7th to 12th May, and from 14th to 19th June. Each will be attended by 42 engineers from the North Western, the Merseyside and North Wales, and the South West Scotland Area Boards, the North Western and the Merseyside and North Wales Generating Divisions, and the headquarters of the Central Authority. The ten lecturers will be drawn from various Divisions of the B.E.A. and also from manufacturers of protective gear and associated apparatus.

Edinburgh Modern Homes Exhibition

One of the attractions at the recent Modern Homes and Health Exhibition held in Edinburgh, was the stand of the South East Scotland Electricity Board, the theme of which was "Electricity in the Home." Among the appliances which aroused interest was the new Staines auto-sink domestic dish-washer, shown for the first time in Scotland. Also on view was a comprehensive range of cookers, washing machines, refrigerators, water heaters, wash boilers and small domestic appliances. A set of models showing various applications of water-heating installations attracted attention.

New Iron and Steel Order

The Minister of Supply has made the Control of Iron and Steel (No. 78) Order, 1950, which came into operation on 1st May. The Order amends maximum prices, the principal alterations being (1) an increase in the price of basic pig iron (this is an adjustment within the steel industry and no increase in price of pig iron or steel to outside consumers follows from it), and (2) the withdrawal from price control of railway coil springs and laminated railway springs. Copies of the Order may be obtained from H.M. Stationery Office or through any bookseller.

Time Switches for Australia

For the fifth time in succession Venner Time Switches, Ltd., has received the contract for supplying the State Electricity Commission of Victoria with time switches for the control of off-peak consumer loading. The switches concerned are of the synchronous motor-driven type and incorporate an auxiliary spring reserve mechanism which maintains the switch in operation during a supply failure. In addition, the Meter Division has also received a substantial order for the supply of house ser-

Mr. O. F. Mingay, Mr. J. M. Brooke (managing director of Venner Time Switches, Ltd.), and Mr. H. G. Craig, at the factory of Venner Time Switches, Malden, Surrey

vice meters to the Electriciteit Maatschappij Aniem N.V. of Amsterdam and Java.

Recent visitors to the Venner factory in Surrey included Mr. O. F. Mingay, managing director of the Mingay Publishing Co. Pty., Ltd., of Sydney, Australia, and Mr. H. G. Craig, a director of H. Rowe & Co. Pty., Ltd., of Melbourne, Australia.

Batti-Wallahs' Society

Probably one of most adventurous of sports is motor hill climbing, and some of hazards of this sport were related by Mr. F. J. Findon at last week's luncheon of the Batti-Wallahs' Society. Mr. Findon, who, in addition to being editor of the *Light Car*, has also acted as commentator at these races, is well qualified to speak on the subject, both from the technical and racing aspects. He reviewed the development of this class of sport from its early days to the present time, and described some of the "home-made" racing cars which have made history. His account not only revealed the spirit of adventure which makes these race meetings possible, but also the care and accuracy of British technicians in building up machines which incorporate all that is best in racing cars.

Members of the Society are reminded that future luncheons will be held on the last Wednesday in the month (not Thursday), and at the next luncheon (on 31st May), Mr. H. Nimmo will be formally inducted as president for the ensuing year.

Industrial Exhibition

A prominent position was occupied at the eight-day exhibition of industrial products made within the borough of Brentford and Chiswick by the stand of the Southern Electricity Board, which featured canteen cooking, water heating and the advantages of correcting the power factor of industrial loads. A representative of the Board's Contracting Department was in attendance.

Model water cooling towers, both timber and concrete, were displaved by Film Cooling Towers, Ltd., which designs and undertakes contracts for their erection at home and abroad. Besides machine tools the Belmont Engineering Works make side moulds and press tools for the moulding of electrical components. The range of plastic mouldings of Ranton & Co., Ltd., includes "Rock" brand electrical accessories. Ship's speed indicators and recorders of distance travelled are made by the Improved Submerged Log Co., Ltd., includes the Chernikeeff type of equipment. The design and manufacture of gyroscopic and precision electrical apparatus are specialities of R. B. Pullin & Co., Ltd. Of the subsidiary concerns, the Pullin Optical Co. markets photo-electric exposure meters; Measuring Instruments (Pullin), Ltd., manufactures portable and switchboard meters, while S. A. Fane (High Wycombe), Ltd., specialises in wooden instrument cases. The name of the Sperry Gyroscope Co., Ltd., indicates the type of compasses and associated equipment it makes for use in ships and aircraft.

Arbitration Tribunals Move

The offices of the Central Valuation Board, the Panel of Arbitrators and the Panel of Referees under the Coal Industry (Nationalization) Act, 1946, the Electricity Arbitrations Tribunal under the Electricity Act, 1947, and the Gas Arbitration Tribunal under the Gas Act, 1948, have been removed to Room 85, Queen Anne's Chambers, Broadway, S.W.1. (Telephone: Whitehall 7010, extension 105.)

E.C.C. Sales Conference

A sales conference of district representatives (Home areas) of the Electric Construction Co., Ltd., with members of the works executive staff, was held on 18th April in the bowls pavilion of Bushbury Engineering Works, Wolverhampton. The conference was presided over by Mr. W. M. B. Furniss, assistant managing director, and was attended by forty representatives.

Exide Scottish Conference

Delegates from Exide service agents all over Scotland travelled to Edinburgh on 19th April to discuss sales and service problems with executives of Chloride Batteries, Ltd., at a conference held in the North British Hotel. The chairman and convenor of the meeting was Mr. J. N. Smith, of Spark's of Aberdeen, Ltd. Among those representing the Exide Co. were Mr. E. Powell, sales manager, Mr. H. E. Bayman, and Mr. A. T. Fraser, manager of the Glasgow Exide depot.

Brush Group's Acquisition

The Brush Electrical Engineering Co., Ltd., has announced that the group has acquired an interest in the Switchgear & Erection Co. (Pty.), Ltd., of Germiston, Johannesburg. This latter company has been re-formed, and its title is now the Switchgear and Engineering Corporation of South Africa (Secor), and it is the intention that the present range of switchgear will be extended, and the manufacture of small transformers and motors will shortly be introduced. Technical and design facilities of the Brush Group will be at the disposal of the new Corporation and technical assistants will be provided as necessary from England. The

existing directors of Switchgear and Erection (Pty.), Ltd., are joining the new board, and the management will remain unchanged. Mr. L. H. L. Badham will continue as managing director. Mr. J. White, chairman and managing director of Brush (S.A.), Ltd., together with Mr. S. A. Lane, an executive director of the Brush Electrical Engineering Co., Ltd., in England, are joining the board of Secor.

International Sales Convention

Delegates from many countries abroad, as well as a strong United Kingdom contingent, will attend the 1950 sales convention of the Driver-Harris organization, which opens at Alderley Edge, Cheshire, on 10th May. In addition to discussions on domestic questions, such as production, deliveries, distribution and publicity, there will be discussions on new alloys produced during the past year and on the widening field of application of the company's specialist service on nickel and nickel alloys.

B.T.H. Parents' Day

The B.T.H. Rugby Works Parents' Day was held on 22nd April, 240 parents and 120 first-year apprentices attending, together with a number of B.T.H. officials and others, making a total of over 500. The day's programme opened with a visit in the morning by the parents to the Rugby College of Technology and Arts. Lunch was served at Coton House for parents of apprentices resident in the hostel, and in the main works canteen for parents of apprentices resident elsewhere. After a tour of the works during the afternoon, a fleet of motor coaches took the visitors to Coton House for tea, where they were welcomed by Mr. H. L. Satchwell (director, manager Rugby Works), who gave some details of the B.T.H. apprenticeship schemes. Mr. L. J. Davies (director of research and education), in an address dealt with the responsibility of parents with regard to launching their sons on their careers, and with the responsibility of the company towards its apprentices.

Industrial Supervisors

At the recent first annual meeting of the Institute of Industrial Supervisors it was reported that twelve local sections have been started in various parts of the country while two further sections are being formed this month at Bristol and Rotherham. The sections so far established have held 130 meetings with a combined attendance of 11,000 foremen and supervisors. An Educational Advisory Panel has been formed to guide the Institute in its educational work, and an educational qualification for graduate membership was adopted at the annual meeting. The Institute has already organized week-end residential courses and lecture discussion courses on subjects of value to supervisors. Short foremanship refresher type courses are being arranged in several areas with the co-operation of local educational authorities.

Aluminium Supplies

The Ministry of Supply announces that it has contracted to buy 96,000 metric tons of virgin aluminium from Aluminium, Ltd., of Canada during 1950. Total imports of virgin aluminium from Canada during 1950 are expected to reach about 136,000 tons, comprising 96,000 tons from the new contract and about 40,000 tons under the 1949 contracts. In 1949, when 161,000 tons was imported from Canada, stocks rose above the level considered necessary.

Further Lead Price Increase

The Ministry of Supply has announced that from 27th April the price of good soft pig lead has been increased by £2 to £88 per ton delivered.

Duddell Oscillographs

In our issue of 21st April we published a picture of a 12-channel Duddell oscillograph made by the Cambridge Instrument Co., Ltd. We would point out that this is the standard instrument and should not be confused with the portable field model which is, of course, much smaller.

New Mullard Company

The expansion of the Mullard Company's business in all parts of the world has rendered it necessary to segregate its export activities from its home trade, and a new private company entitled Mullard Overseas, Ltd., has been incorporated, with a nominal capital of £250,000. This company will co-ordinate the export trade of the Mullard Company from the United Kingdom.

Catalogues and Lists

Reliance Electrical Wire Co., Ltd., Fingal Works, Staffa Road, Leyton, London, E.10. —Catalogue of cords and cables for all purposes.

C. W. Denny, 8, Beaumont Court, Sutton Lane, Chiswick, London, W.4.—Leaflet describing a 3 kW a.c. and 2 kW d.c. bimetal flasher and a 1 kW scintillator.

Carr Fastener Co., Ltd., Stapleford, Nottingham.—Catalogue (No. 900) of "Cinch" radio, electronic and television components.

D. P. Battery Co., Ltd., Bakewell, Derbyshire.—Booklet by H. G. Brown entitled "The Evolution of the Electric Storage Battery."

ELECTRICITY SUPPLY

Wind Power Research

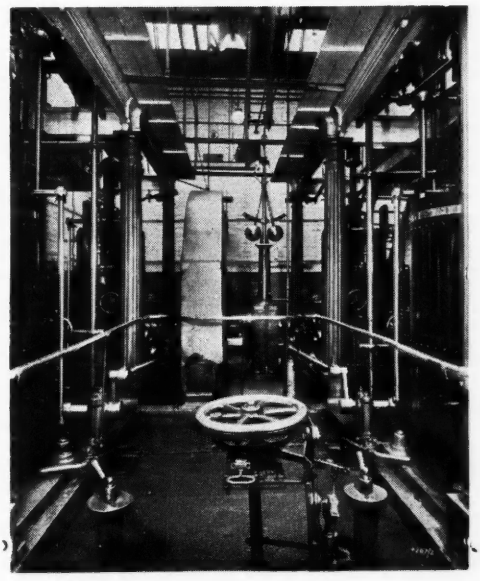
THE *Board of Trade Journal* states that a meeting has been convened by the Organization for European Economic Co-operation under the chairmanship of Prof. D. Dresden (Holland) to formulate a programme of joint research into the use of wind power for the generation of electricity in such O.E.E.C. member countries as are interested in the project. It is planned that individual member countries will continue to build pilot plants and conduct research on their own lines, but will employ so far as may be possible common methods of meteorological measurements and a uniform presentation of results. Information will be exchanged between member countries in order to avoid wasteful duplication of effort and research workers will also be exchanged between different countries. It is proposed to select a common site on which co-operative research will be conducted with models and prototypes made available by various countries for comparative tests.

Scottish Mill Modernization

Ancient Beam Engines

As part of a modernization scheme being carried out by John Lean & Sons, Ltd., Bridgeton, Glasgow, two beam engines which have been in service for many years are being replaced by a number of motors to drive the existing machines in groups, after which there will be a gradual change-over to individual drive. This will eventually be one of the most modern weaving installations in the country, practically the whole of the output of which is marketed in the Far and Middle East.

The original engine shown on the left of the accompanying photograph, which we have received from the South West Scotland Electricity Board, consisted of a compound beam engine installed in 1857 and developing 125 h.p. at 30 strokes per minute. As the factory extended it was found necessary to increase the power of the engine and a duplicate, driving on to the same shaft, was installed seven years later.



Part of the engine-room of John Lean & Sons showing the beam engines which are being replaced

Electricity in the Orkneys

A White Paper published last Friday gives details of the proposal to construct a diesel generating station with a capacity of about 7,000 kW at Kirkwall to meet the growing demand for electricity in the Orkney Islands. This is Constructional Scheme No. 53 of the North of Scotland Hydro-Electric Board, which has been approved by the Secretary of State for Scotland and has been laid before Parliament.

The estimated cost is £281,000. There were no objections to the project. The Fisheries Committee had no recommendations to make and the design of the power station,

as finally incorporated in the scheme, was accepted by the Amenity Committee.

Grimsby Demonstration Theatre

On 24th April a new demonstration theatre and display windows were opened in Grimsby by the chairman of the Yorkshire Electricity Board, Mr. W. M. Lapper. The demonstration theatre is attached to the service centre in Victoria Street and provides accommodation for demonstrations and the showing of films. There is a completely equipped kitchen and a film unit.

Teaching Blind Girls to Cook

The Eastern Electricity Board has co-operated in an experiment in teaching blind girls at Chorley Wood College to cook by electricity. The big problem was that of judging temperatures. Various experiments were conducted by the staff of the Chilterns Sub-Area, including the fitting of metal strips bearing Braille symbols to the various switch knobs. These indicate temperature scales and setting by the touch of the fingertips. The thermostatic control was adapted to operate a buzzer at a predetermined temperature. This sounds until oven temperature has risen 15 deg above the predetermined figure and then ceases until the temperature falls to the proper level. The buzzer, scarcely audible to a normally sighted person, is easily heard by the blind girls who have more acute sense of hearing.

Street Works Bill

THE establishment of a general uniform code of procedure to regulate the breaking-up of streets for such purposes as the laying of pipes, mains and cables is proposed in the Public Utilities Street Works Bill, the text of which was published last week. The Bill will carry out the recommendations made by the Joint Committee of the House of Lords and House of Commons under the chairmanship of Lord Carnock in its report of 1939.

The code will replace all existing street work codes and govern any new powers to break up streets that may be given to public utilities. When agreement cannot be reached about the proposed works the matter is to be settled by arbitration. The code contains an important provision restricting the breaking up of a street by statutory undertakings for twelve months after it has been reconstructed or substantially repaired. At present only the principal thoroughfares in London are protected in this way. It is also provided that where highway authorities are in control of land which is earmarked for future incorporation in an adjoining street they may require public utilities to lay their pipes in such land instead of in the street itself.

In Part II, which deals with the procedure to be adopted when highway authorities, etc., carry out works which may affect apparatus belonging to statutory undertakings effect is given to the principle that the party initiating the works shall pay the cost of alterations in undertakings' apparatus made necessary by such works. Part III contains provisions for the mutual protection of statutory undertakings having apparatus in the same street.

PARLIAMENTARY NEWS

By Our Special Reporter

REPLYING to Col. Ropner in the House of Commons last week, Mr. John Freeman said he was aware that there was still a shortage of some types of high-voltage insulators, but the supply was improving and would continue to improve as the measures already taken to increase manufacturing capacity became fully effective.

Grants for Farmers.—Mr. Tom Williams told Mr. Fort that under Section 1 and the First Schedule of the Hill Farming Act, 1946, a grant might be paid towards the cost of installing a supply of electricity on a hill farm, provided the work formed part of a comprehensive improvement scheme for the farm. Grant was paid only on the initial capital cost of installation; no grant was paid on guaranteed minimum annual consumption charges. Farms eligible for grant were those which consisted wholly or partly of hill farming land as defined in the Act.

Television.—The Postmaster-General (Mr. Ness Edwards), replying to a question by Mr. Grey, that he was prepared to issue licences for television wire broadcasting on terms corresponding in general to those applicable to sound wire broadcasting. The detailed arrangements were not, however, yet complete and the industry was to be consulted on technical matters.

Answering Mr. Elwyn Jones Mr. Ness Edwards said that no steps were at present in contemplation to provide a television station in North Wales. It was too early to say what steps might be practicable further to extend the coverage of television on the completion of the present plan.

FINANCIAL SECTION

Company Notes and Stock Exchange Activities

REPORTS AND DIVIDENDS

Associated Electrical Industries, Ltd., reports a consolidated profit of the company and its subsidiaries for 1949, after deducting working expenses and depreciation, of £6,707,000, as compared with £5,412,000 for the previous year. In addition to the normal depreciation, a further sum of £500,000 has been set aside by the holding company from the profits of the year towards the increased replacement cost of fixed assets. United Kingdom taxation absorbs £3,519,000, and the consolidated net profit is £2,688,000 (against £2,526,000). The proportion of consolidated net profit attributable to minority interests in subsidiary companies is £3,000, and after adding £250,000 over provision for taxation in previous years, there is a total of £2,935,000. The profits carried forward in the accounts of the subsidiaries amount to £412,000, leaving a profit for the year to be dealt with in the accounts of A.E.I. of £2,523,000 (against £1,957,000). It is proposed to pay a final dividend on the ordinary stock of 10 per cent, maintaining the distribution for the year at 15 per cent, less tax.

The Rheostatic Co., Ltd.—The annual meeting was held on 27th April when Mr. M. J. Gartside (chairman), who presided, said that the new developments of "Satchwell" controls mentioned last year had enabled them to strengthen their position in the central heating field both at home and abroad, and gradually increasing demand since that time had resulted in a substantial addition to their output during the current year. Orders from overseas during the period were a record. Devaluation had considerably assisted them in entering new markets and consolidating their position in existing ones in face of American competition, and the value of export orders received continued at a similar high level during the current year. Further new designs of "Satchwell" controls for the domestic heating field would shortly reach the production stage. The works were in full production and further increase of demand would require extensions of buildings and plant. The board had plans ready for execution as and when the need arose.

The Telegraph Condenser Co., Ltd., reports a trading profit for 1949 of £163,022, as compared with £202,954 for the preceding year, to which is added interest on loan and tax reserve certificates £2,217, making £165,239. From this the following deductions are made: Depreciation, £24,554; loss on sales of plant, £708; directors' fees, £2,300; management remuneration, £8,420; audit fee, £551; profits tax, £18,300; and income tax, £49,512. The final ordinary dividend is 10 per cent (unchanged), again making 15 per cent for the year. The balance carried forward is £48,265 (against £43,843 brought in).

Morphy-Richards, Ltd., have applied to the Capital Issues Committee for permission to raise further capital. Part of the finance required is to be obtained by an increase of loan capital and part by an issue of a further 150,000 ordinary shares. An increase in authorized capital by the creation of 250,000 4s ordinary shares will be proposed at an extraordinary meeting to be held on 9th May. The new capital will finance the building of an additional factory at St. Mary Cray, for which practically all the necessary licences have been obtained. Since the beginning of 1950, the average output of electric irons has been 30 per cent up on the average for the last six months of 1949. Output of toasters has reached 500 per working day. The total sales for the nine months to March exceeded the sales for the year to June, 1949.

The Chloride Electrical Storage Co., Ltd., reports a balance of group profits available for 1949 of £791,232, as compared with £317,039 for 1948. The balance is struck after providing for depreciation and other provisions, including net tax provision of £1,007,409. It is proposed to pay, in addition to the 5 per cent paid last October on the ordinary capital, a further ordinary dividend of 7½ per cent, as increased by the 100 per cent capital bonus last November. The interim of 5 per cent for 1948 was followed by a final payment of 15 per cent, which included a 10 per cent bonus.

C. A. Parsons & Co., Ltd., report a profit for 1949, after all charges, including taxation, of £407,475, as compared with £178,735 for 1948. In addition there is £125,088 income tax and profits tax repaid in respect of industrial buildings balancing allowance. The profit was arrived at after provision for contingencies of £60,000. It is proposed again to pay a final ordinary dividend of 7½ per cent, and in addition a

jubilee bonus of 2½ per cent, making a total for the year of 15 per cent (against 12½ per cent).

Cable & Wireless (Holding), Ltd., reports that the balance of profit and loss account for 1949, before providing for taxation is £2,954,222. After meeting taxation and making various adjustments £878,358 is left for appropriation by Cable & Wireless (Holding). The balance brought in is £483,566, making a total of £1,361,924, and after repaying £69,320 to a former subsidiary in respect of E.P.T. settlement, the net sum available is £1,292,604. The dividend on the ordinary stock is 4 per cent (unchanged), and the balance carried forward is £633,987.

Aerialite, Ltd., is holding an extraordinary meeting on 30th May to consider resolutions providing that £28,000 from reserves be capitalized by paying up in full 560,000 ordinary shares of 1s each, to be distributed to ordinary holders in the proportion of seven new shares for every eight ordinary stock units of 1s each held.

The Electric & General Investment Co., Ltd., is offering to ordinary stockholders 15,000 £1 ordinary at 50s per share in the proportion of one new share for every £4 stock held. The new shares will not rank for dividend in respect of the year ending 31st May next.

The British Vacuum Cleaner & Engineering Co., Ltd., reports a group profit for the year to 30th September last of £35,197, as compared with £11,093 for the preceding year. The dividend for the year is unchanged at 20 per cent.

Burco, Ltd., has declared an interim dividend of 15 per cent.

NEW COMPANIES

Houghton & Osborne, Ltd.—Registered 24th April. Capital £1,000. Merchants, manufacturers, factors, importers, exporters and repairers of and agents for television and electronic apparatus, etc. Subscribers: J. Moakes and A. A. Malnick. Regd. office: 6, High Street, Thame, Oxon.

Visual Sound Services, Ltd.—Registered in Belfast 12th April. Capital £2,000. Radio and electrical engineers, cinematograph engineers, etc. Subscribers: Miss Emily Martin and H. L. McCracken. Regd. office: 4, Mayfair, Arthur Square, Belfast.

WINDING UP ORDER

Maida Vale Electric Co., Ltd.—In the Companies Court on 24th April Mr. Justice Wynn Parry heard a petition for the winding up of this company. Counsel said this was a judgment creditor's petition for £610. There was no opposition. His Lordship made the usual compulsory winding up order.

LIQUIDATIONS

Duralite, Ltd., manufacturers of lamps, 3, Gray's Inn Place, W.C.1.—A meeting of creditors was held recently when a statement of affairs was submitted which showed liabilities amounting to £125,800. The net assets were £55,649, leaving a deficiency of £70,151. The matter was left in the hands of Sir H. M. Barton, of Barton, Mayhew and Co., Alderman's House, Bishopsgate, London, E.C.2, as liquidator. A committee of inspection was also appointed.

Norman Cooper (Isle of Wight), Ltd.—Winding up voluntarily. Liquidator, Mr. N. W. Osborne, 11-12, Finsbury Square, London, E.C.2.

BANKRUPTCIES

W. L. Kirby, trading as Borough Electric Co., 24, Delafield Road, London, S.E.7, lately carrying on business at Dornberg Works, Dornberg Road, Blackheath, S.E.3, electrical engineer.—Receiving order made 24th April on a creditor's petition.

T. G. Evett, residing and carrying on business at 3, Lindsey Road, Cleethorpes, Lincs., electrical contractor, trading as "Events."—First meeting 5th May, at the Official Receiver's office, 8, Flottergate, Great Grimsby. Public examination 8th June at the Town Hall, Great Grimsby.

N. A. M. Settle, residing at 142, St. George's Road, Bolton, Lancs, electrical engineer.—Trustee, Mr. A. T. Eaves, 47, Mosley Street, Manchester, 2, released 13th March, 1950.

E. Whittington, carrying on business at Mona Villa Works, Clifton Lane, Rotherham, as Modern Electric Service, manufacturer and electrical engineer.—Last day for receiving proofs for dividend 12th May. Trustee, Mr. A. T. Eaves, 47, Mosley Street, Manchester, 2.

G. A. Ince, carrying on business at 124, Higher Road, Urmston, Lancs, under the style of Higher Road Electrical, electrical and radio contractor.—Receiving order made 20th April on debtor's own petition.

F. McMahon, 3, Exeter Street, Leeds, electrician, formerly carrying on business at Camden House Chambers, Leeds, 2.—First meeting 5th May at the Official Receiver's office, 29, East Parade, Leeds. Public examination 20th June at the Court House, Albion Place, Leeds.

J. F. Gannon, carrying on business at 11, Barclay Street, Leeds, electrical engineer.—Trustee, Mr. R. B. Smith, 3, Alfred Street, Boar Lane, Leeds, appointed 21st April.

FINANCIAL SECTION

STOCKS and SHARES

STOCK Exchange prices in the gilt-edged market have continued to be depressed by the forthcoming issue of British Electricity stock, the advent of which had been definitely expected over last week-end. No prospectus appeared, however, and prices eased off during the period of uncertainty. Dealings started, on Tuesday in this week, in the Cable & Wireless (Holdings) new stocks. In advance, it was thought that the new ordinary stock would be quoted between 97½ and 100; while on the new 4 per cent unsecured stock a premium of several points was regarded as practically assured.

Month's Price Changes

Prices since a month ago show a good many alterations, most of them being upward. Company dividends and reports now appearing are generally favourable to stockholders. Associated Electrical Industries, for instance, publishes an excellent report, showing that the gross profits for last year rose by nearly £1,300,000, half the increase, by the way, being taken by the tax collector. The dividend is repeated at 15 per cent, and the shares at 72s 6d are ⅛ harder, giving a return of £4 2s 9d per cent. On the month, Revo have gained 3s, at 43s, and Ericssons 3s 3d, at 45s 9d. Automatic Telephones 57s, Allen West 8s, English Electric 42s, Electric Construction 47s are amongst other good spots. Tube Investments are ⅛ higher at 5¾ and Hoovers, 38s 6d, are also 2s 6d up. A feature in the electricity supply market is a gain of 12s 6d in Cawnpore Electrics at 50s. Anglo-American Telegraph deferred is up 5, at 17½; International "Tel. & Tel." at 31 are 7 dollars higher. Plessey 5s shares are changing hands around 16s 3d, at which the yield on the last dividend of 20 per cent is £6 3s per cent; the interim for the year ending next June is due shortly.

C. A. Parsons

C. A. Parsons announced a profit for the year, after all charges, including taxation, of £407,475, against £178,735 in the previous twelve months. Substantial increases to taxation and reserves are also made, and it is no exaggeration to describe the year's results as astonishing. Possibly the chairman may have something to say about the extraordinary rise in profits at the meeting. The price of the ordinary shares has risen 5s since a month ago, to 65s, at which the return, on the 12½ per cent dividend, comes to £3 17s per cent.

Chloride Electrical Expansion

The final dividend of 7½ per cent declared by Chloride Electrical is at half the rate of last year's corresponding payment; being payable on double the capital—as a result of the 100 per cent share bonus made in December—it represents the same amount of money. The interim of 5 per cent for the past year was paid before the bonus, so that although the total for the year is given as 12½ per cent, the shares have to be valued —strictly speaking—on a 10 per cent basis. Both the "A" and "B" ordinary are quoted at 47s affording a yield of 4¼ per cent. Since last year's 20 per cent dividend payment came from earnings of nearly 110 per cent, and since group profits for 1949 show a further striking expansion, the modesty of the return is easily understandable.

Americans and E.M.I.

Electric & Musical shares, after their meteoric rise have settled down to more sober conditions with the price about 25s 6d. The American demand which caused the jump from 19s 6d to 29s—from which it subsequently reacted to the present quotation—seems to have been based upon widely spread recommendation, in the United States, of television companies' shares by New York houses which took an optimistic view of the television future. Lists were circulated of shares in concerns connected with the industry, amongst the cheapest shares being Electric & Musical. The excitement has since died down, and the price reacted from the best upon selling, on this side, by profit-takers.

Ever Ready Dividend

The annual report and full accounts of Ever Ready (Great Britain) were due to appear this week-end. The 5s shares, now 31s, have been under the influence of the final dividend reduction, announced with the preliminary figures ten days ago. According to these, trading profits were practically maintained, and the high rate of profits tax is to blame for the break in a ten-year run of 40 per cent annual distributions. The ordinary are receiving this time a total of 35 per cent, which puts them on a yield basis of £5 13s per cent. The 7 per cent participating preference, which regularly receive their extra 3 per cent, are quoted at 36s 3d, giving a return of 5½ per cent.

Electrical Investments

Past Month's Price Changes

Company	Dividend: Previous	Dividend: Last	Middle Price 1 May 1950	Month's Rise or Fall	Yield p.c.
Overseas Electricity Companies			£ s. d.		
Atlas Elec.... ...	2	2½	14/3	—	3 10 2
Calcutta Elec. ...	6†	6†	23/6	+1/6	5 2 2
Cawnpore Elec. ...	13	10	50/0	+12/6	4 0 0
East African Power	7	7	34/9	+6d.	4 0 7
Jerusalem Elec. ...	5	6	13/3	—	—
Madras Elec. ...	8	5	30/-	—	3 6 8
Nigerian Elec. ...	10	10	30/-	—	6 13 4
Palestine Elec. "A"	Nil	5†	22/6	+1/6	4 9 0
Perak Hydro-Elec.	Nil	Nil	8/-	−6d.	—
Whitehall Inv. Pref.	—	6	23/6	—	5 4 4
Equipment and Manufacturing					
Aberdare Cables ...	15	20	57/6	−1/8	6 19 0
Aron Elec. Ord. ...	15	15	28/9	—	10 8 8
Assoc. Elec. Ord. ...	15	15	72/6	+1/8	4 2 9
Automatic Tel. & El.	12½	12½	57/-	+2/-	4 7 9
Babcock & Wilcox	15	15	58/3	—	5 2 9
Baldwin, H. J. (2/-)	25	25	4/9	—	10 10 6
British Aluminium	10	10	39/6	−6d.	5 1 3
B.I. Callender's ...	6¾	6¾	31/6	—	4 5 2
British Thermostat (5/-)	23½	25	24/6	—	5 2 1
British Vac. Cleaner (5/-)	20	20	11/-	+1/6	9 1 10
Brush Ord. (5/-) ...	10	10	6/-	−6d.	8 6 8
Burco (5/-)... ...	35	35	20/-	—	8 15 0
Chloride El. Storage	20	12½	47/-	+1/8	4 5 3‡
Cole, E. K. (5/-) ...	22½	20	16/3	—	6 3 1
Cossor, A. C. (5/-)...	Nil	Nil	8/6	+9d.	—
Crabtree (10/-) ...	17½	17½	34/-	+6d.	5 3 0
Crompton Parkinson Ord. (5/-) ...	22½	22½	11/-	—	5 2 0‡
De La Rue (5/-) ...	50	50	19/6	−1/9	12 16 4
Decca (1/-)... ...	112½	112½	13/-	+1/8	8 13 0
E.M.I. (10/-) ...	8	8	25/6	+5/9	3 2 9
Electrical Components (5/-) ...	20	20	10/9	—	9 6 0
Elec. Construction	12½	12½	47/-	+1/8	5 6 5
Enfield Cable Ord.	7½	7½	32/-	+9d.	4 13 9
English Electric ...	10	10	42/-	+1/6	4 15 3
Ericsson Tel. (5/-)...	20†	20†	45/9	+3/3	2 3 8
Ever Ready (5/-) ...	40	35	31/-	−3d.	5 13 0
Falk Stadelmann ...	15	15	37/6	+1/8	8 0 0
G.E.C. Ord. ...	17½	17½	75/-	—	4 13 4
General Cables (5/-)	50	50	16/3	—	9 4 8‡
Greenwood & Batley	15	15	38/3	—	7 16 10
Hackbridge Cable (5/-)	—	20	12/-	+6d.	8 6 8
Hackbridge Hewittic (5/-)	12	12½	12/6	—	5 0 0
Hall Tel. Acc. (10/-)	10	10	14/6	+1/-	6 18 0
Heatrae (2/-) ...	12½	12½	4/-	—	6 5 0
Henleys (5/-) ...	20	20	22/6	—	4 9 0
Hoover (5/-) ...	40	45	38/6	+2/6	5 17 0
Intl. Combustion (5/-)	37½	37½	15/-	—	5 0 0‡
Johnson & Phillips	15	15	61/3	+6d.	4 17 10

Company	Dividend: Previous	Dividend: Last	Middle Price 1 May 1950	Month's Rise or Fall	Yield p.c.
Equipment and Manufacturing (continued)			£ s. d		
Lancashire Dynamo	22½	22½	92/6	—	4 17 0
Laurence, Scott (5/-)	12½	12½	13/3	—	4 15 3
London Elec. Wire	10	10	46/3	+1/8	4 6 7
J. Lucas	17½	17½	26/6	−1/-	4 8 0‡
Mather & Platt ...	11	11	48/6	+9d.	4 10 2
Metal Industries ...	10	10	40/-	−1/8	5 0 0
Mid. Elec. Mfg. ...	35	12½	53/9	—	4 13 0
Murex	20	20	44/6	—	4 10 0‡
Newman Ind. (2/-)	22½	17½	3/-	−6d.	—
Oldham & Son (1/-)	60	60	5/6	—	5 10 0‡
Plessey (5/-) ...	20	20	16/3	+1/8	6 3 0
Parsons C. A. ...	12½	12½	65/-	+5/-	3 17 0
Pye Deferred (5/-)...	25	25	31/3	—	4 0 0
Radio & Tel. (2/-)	Nil	25	9d.	—	—
Revo (10/-) ...	27½	27½	43/-	+3/-	6 8 0
Reyrolle	12½	15	65/-	+1/8	4 12 6
Scophony Baird (1/-)	—	—	3/-	+6d.	—
Scot. Cable (4/-) ...	30	30	23/-	+1/-	5 4 4
Siemens Ord. ...	7½	7½	31/3	—	4 16 0
Switchgear & Cowans (5/-)	20	20	15/-	—	6 13 4
T.C.C. (10/-) ...	15	15	33/9	—	4 8 9
T.C. & M.	10	9	36/3	—	4 8 3‡
Telephone Mfg. (5/-)	9	9	9/3	—	4 17 3
Thorn Elec. (5/-) ...	25	20	16/3	—	6 3 1
Tube Investments	25	25	5⅝	+1/8	4 6 10
Vactric (5/-) ...	Nil	Nil	7/6	−1/8	—
Veritys (5/-) ...	5	5	3/6	—	7 2 10
Walsall Conduits (4/-)	70	70	53/9	—	5 4 1
Ward & Goldstone (5/-)	50	50	35/-	−1/8	5 14 3‡
Watford (2/-) ...	20	20	6/-	−3d.	6 13 4
Westinghouse Brake	14	14	55/-	—	5 1 10
West, Allen (5/-) ...	10	10	8/-	+1/8	3 18 2‡
Transport and Communications					
Anglo-Am. Tel: Pref.	6	5 13/20	97½	+1	5 15 9
Def.	—	—	17½	+5	—
Anglo-Portuguese...	8	8	25/6	—	6 5 6
Brit. Elec. Traction: Def. Ord. ...	50	50	420	—	3 18 6‡
Calcutta Trams ...	Nil	6†	25/-	+1/2	4 16 0
Cape Elec. Trams...	6	6	18/6	—	—
Cable & Wireless 5½ Pref.	5½	5½	—	—	—
Ord.	4	4	—	—	—
Globe Tel. & Tel. Ord.	5†	5†	43/9	+9d.	2 5 8
Great Northern Tel. (£10)	12	7	14½	−1/2	4 16 7
Inter. Tel. & Tel. ...	Nil	Nil	31	+7	—
Marconi Marine ...	7½	7½	25/3	+6d.	5 18 10
Oriental Tel. Ord....	10	16	46/3	−1/8	6 18 7
Telephone Props ...	6	6	18/9	—	6 8 0
Tele. Rentals (5/-)...	10	10	10/6	—	4 15 3

† Dividends are paid free of Income Tax.
‡ Yield adjusted to capital bonus issue.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (2s each) may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1945

20542. British Thomson-Houston Co., Ltd.—Electromagnetic induction apparatus. 10th August, 1945. (638861.)

32847. Marconi's Wireless Telegraph Co., Ltd.—Amplitude limiters. 5th December, 1945. (638621.)

1946

20022. Philips Lamps, Ltd. — Electron-discharge tubes comprising a liquid cathode. 4th July, 1946. (638624.)

25824. Malchus, J. A. C.—Electric vacuum cleaners. 28th August, 1946. (638702.)

29433. Philco Corporation.—Electrical picture transmission systems. 2nd October, 1946. (638704.)

37298. Metropolitan-Vickers Electrical Co., Ltd., and Bailey, R. W.—Steam generators. 14th April, 1948. (638552.)

1947

8367. Metropolitan-Vickers Electrical Co., Ltd., and McMullen, J. J.—Equipment for reproducing outlines by photo-electric means. 25th March, 1948. (638554.)

8757. Allmanna Svenska Elektriska Aktiebolaget.—Means for producing a nearly constant alternating voltage. 1st April, 1947. (638752.)

8788. Mozzanini, G. G., and Lebertre, M.—Electric motor control systems. 1st April, 1947. (638633.)

11298. Short Bros. (Rochester & Bedford), Ltd., and Lewis, G. A.—Apparatus for selecting and recording electric signals. 19th April, 1948. (638830.)

12678. Welding Supplies, Ltd.—Welding rods for arc-welding and the like. 9th May, 1947. (Cognate application 12679, 15th April, 1947.) (638557.)

14824. Furzehill laboratories, Ltd., Smith & Sons (England), Ltd., S., and Milsom, F. R.—Automatic motor control systems. 2nd June, 1948. (638559.)

16276. Baker, J. E., and Weston, F. H.—Electric air-heaters. 20th July, 1948. (638875.)

18059. Lumb, C. F.—Immersion electrical heaters for pre-heating internal-combustion engines. 2nd June, 1948. (638639.)

19485. Radio Corporation of America.—Colour television system. 21st July, 1947. (638568.)

20363. Oldham & Son, Ltd., and Martin, J. R.—Electric accumulators. 9th July, 1948. (638717.)

20797. Westinghouse Electric International Co.—X-ray tubes and energizing systems therefor. 31st July, 1947. (Addition to 624332.) (638642.)

20933 and 20935. Electrolux, Ltd. Vacuum cleaners. 1st August, 1947. (638574 and 638575.)

21698. Sylvania Electric Products, Inc.—Bases for electric-discharge lamps. 7th August, 1947. (638883.)

21764. Western Electric Co., Inc.—Connecting and assembling electrical terminals. 7th August, 1947. (638884.)

21813. Electroflo Meters Co., Ltd.—Density measuring apparatus. 8th August, 1947. (638578.)

22077. Sylvania Electric Products, Inc.—Apparatus for coating fluorescent lamps. 8th August, 1947. (638885.)

22083. Sylvania Electric Products, Inc.—Apparatus for lamp stem manufacture. 8th August, 1947. (638674.)

22521. Rogers, J. T.—Electrical arrangements for indicating the occupancy of seats. 9th August, 1948. (638579.)

23229. British Thomson-Houston Co., Ltd.—Refrigerators. 21st August, 1947. (638675.)

24253. Franklin, E.—Electric-discharge tube apparatus. 10th August, 1948. (638833.)

25060. British Thomson-Houston Co., Ltd.—Supports for food storage receptacles in refrigerators. 12th September, 1947. (638677.)

27890. Every, C. E. (Titanium Alloy Manufacturing Co.).—Ceramic dielectric materials and methods of manufacturing the same. 17th October, 1947. (638834.)

28992. Cinema-Television, Ltd., and Jesty, L. C.—Colour television or like systems. 30th September, 1948. (638590.)

31548. General Electric Co., Ltd., and Crighton, I. G.—Electric pulse circuits. 10th November, 1948. (638683.)

34419. Hoover, Ltd.—Electric toasters. 29th December, 1947. (638659.)

1948

164. Dubilier Condenser Co. (1925), Ltd., Bennett, A. E. C., and Pitt, A. T.—Electrical condensers. 3rd January, 1949. (638600.)

344. Haworth, L.—Aircraft power plant control systems. 9th December, 1948. (638768.)

1200. Autophon Akt.-Ges.—Audio-frequency amplifier for magnetic recorders with high-frequency erasing. 14th January, 1948. (638690.)

2520. Evans, D. J.—Electrolytic cells. 28th January, 1949. (Cognate application 16590, 21st June, 1948.) (638694.)

3276. General Electric Co., Ltd., Farren, L. I., Head, N. E., and Levy, M. M.—Electric pulse signalling systems. 31st January, 1949. (638897.)

4770. Metropolitan-Vickers Electrical Co., Ltd.—Tuning arrangements for high-frequency radio receivers. 18th February, 1948. (638899.)

5793. Nestle-Lemur Co.—Electrically heated apparatus for waving hair. 26th February, 1948. (638722.)

6937. Ramsey, A. R. J. (Cory Corporation).—Electrically heated beverage brewer. 5th March, 1948. (638611.)

7204. Westinghouse Electric International Co.—Glow switches. 9th March, 1948. (638724.)

8520. Jackson Electric Stove Co., Ltd., and Buckingham, J. W.—Electric or gas cookers, refrigerators or the like. 3rd March, 1949. (638775.)

9222. Murex Welding Processes, Ltd., and Rollason, E. C.—Manufacture of flux-coated aluminium welding electrodes. 30th March, 1949. (638731.)

9897. British Insulated Callender's Cables, Ltd., Poole, J. H., Lewis, S. E., and Taylor, R. C.—Measurement of the thickness of electrically insulating material. 8th April, 1949. (Cognate applications 11411, 26th April, 1948, and 7227, 16th March, 1949.) (638732.)

9996. Redler Conveyors, Ltd., and Allin, C. W.—Rotation-responsive electric switches. 11th April, 1949. (638614.)

11762. Greenslade, G. R.—Galvanometer mounting. 29th April, 1948. (638617.)

13825. General Electric Co., Ltd., and Espley, D. C.—Apparatus for testing transmission lines. 23rd May, 1949. (638738.)

14033. Jones, B. A.—Electrically operated mixing or agitating apparatus. 18th May, 1949. (638739.)

15390. D. S. Plugs, Ltd., Cooper, B. L., and Lund, J.—Plugs for electric circuits. 24th June, 1949. (638780.)

17809. Veritys, Ltd., and Forth, J. W.—Fluorescent tubular lighting fittings. 2nd July, 1949. (638787.)

17913. Thorn Electrical Industries, Ltd., Waigh, D. T., and Strange, J. W.—Starting switches and supply circuits for electric-discharge tubes. 29th June, 1949. (638790.)

18094. Veritys, Ltd., and Forth, J. W.—Fluorescent tubular lighting fittings. 2nd July, 1949. (638796.)

18548. British Thomson-Houston Co., Ltd.—Electric incandescent lamps. 9th July, 1948. (638805.)

18707. Soc. Anon. pour l'Industrie de l'Aluminium.—Electrodes for electric furnaces and methods for protecting the same. 12th July, 1948. (638810.)

18971. Electricity Meter Manufacturing Co., Pty., Ltd.—Electric heating elements of absorption refrigerators. 14th July, 1948. (638816.)

19240. Ward & Goldstone, Ltd., and Hart, G. B.—Electric plug-and-socket couplings. 14th July, 1949. (638846.)

19282. Donovan Electrical Co., Ltd., and Hayward, W. H.—Electric switch fuses. 16th July, 1949. (Addition to 613482.) (638849.)

19342. Accumulatoren Fabriek Varta N.V.—Alkaline batteries. 19th July, 1948. (638850.)

19528. Woods of Colchester, Ltd., and Daly, B. B.—Fan runner. 15th July, 1949. (638856.)

19540. General Electric Co., Ltd., Foxon, H. J., Gomm, W. H. C., Machin, C. F., and Taylor, K.—Electric condensers. 19th July, 1949. (638857.)

TRADE MARKS

APPLICATIONS have been made for the registration of the following trade marks. Objections may be entered within a month of the dates stated:—

19th April.

GLOW-WORM. No. 671,628. Class 9. Electrical apparatus included in Class 9; and weighing and measuring apparatus and instruments. —Glow-Worm Boilers, Ltd., Derwent Foundry, Milford, near Derby.

TELE-NURSE. No. 682,712. Class 9. Telecommunication instruments and apparatus for use in buildings.—Sound Rediffusion (Portslade), Ltd., Duracraft Works, Franklin Road, Portslade-by-Sea.

MECOL. No. 674,690. Class 11. Electric lamps and lighting fittings.—Moorwood Engineering Co., Ltd., Nairobi, Kenya, East Africa. Address for service: c/o Carpmaels & Ransford, 24, Southampton Buildings, Chancery Lane, London, W.C.2.

26th April.

HANDOMAN (design). No. B681,136. Class 7. Electricity generators.—Anning & Mansfield, Ltd., Agriculture House, Queen Street, Exeter.

ATOMIT. No. 673,153. Class 9. Electrodes for electric welding, and electrical contacts.—Cutanit, Ltd., 50, Gresham Street, London, E.C.2.

METAMIC. No.674,642. Class 9. Electrical apparatus and parts, all included in Class 9; measuring instruments and apparatus, assaying instruments and apparatus, and experimental furnaces, and parts; and crucibles.—The Morgan Crucible Co., Ltd., Battersea Church Road, London, S.W.11.

LITHANODE. No. 679,541. Class 9. Electric accumulators.—The Lithanode Co., Ltd., 190, Queenstown Road, Battersea, London, S.W.8.

FIESTA. No. 684,585. Class 9. Electrical apparatus and instruments included in Class 9; and radio receiving sets (complete) and scientific and nautical apparatus and instruments.—E. K. Cole, Ltd., Ekco Works, Southend-on-Sea.

STONEGATE BRITISH MADE (design). No. 686,062. Class 9. Electric accumulators and electric batteries and parts.—The Lithanode Co., Ltd., 190, Queenstown Road, Battersea, London, S.W.8.

AUDIVOX. No. 686,183. Class 10. Electromedical acoustic apparatus, hearing aids for the deaf, medical instruments and apparatus for detecting and estimating the degree of deafness, and parts.—Amplivox, Ltd., Amplivox House, 2, Bentinck Street, London, W.1.

E (design). No. B677,817. Class 11. Lighting fittings of common metal.—George Ellison, Ltd., Wellhead Lane Works, Wellhead Lane, Perry Barr, Birmingham, 22.

NEXT WEEK'S EVENTS

Monday, 8th May to Friday, 19th May

LONDON & BIRMINGHAM.—British Industries Fair. On Friday 12th May the Institute of Export is holding a B.I.F. Gala at Empress Hall, Earls Court (7 p.m. to 1 a.m.).

Monday, 8th May

MANCHESTER.—At the Manchester Geographical Society, 16, St. Mary's Parsonage, 7 p.m. Junior Institution of Engineers, North-Western Section. Presidential address. "Mainly about Steel," by A. Roebuck.

Tuesday, 9th May

LONDON.—Savoy Place, W.C.2, 6 p.m. I.E.E. Education Discussion Circle. Questions night.

Wednesday, 10th May

BRADFORD.—Midland Hotel, 7.30 p.m. A.S.E.E. Bradford Branch. Discussion, "Any Questions?"

LONDON.—Savoy Place, W.C.2, 5.30 p.m. I.E.E. Radio Section. "A Million-Volt Resonant-Cavity X-ray Tube," by B. V. Mills. (Joint meeting with the Utilization Section.)

At the Royal Institution, Albemarle Street, W.1, 6 p.m. Institute of Metals. Annual May Lecture. "Industrial Gas Turbines," by Dr. H. Roxbee Cox.

PRESTON.—Harris Institute, Corporation Street, 7 p.m. I.E.E. North Lancashire Sub-Centre. Annual general meeting. "Technical Considerations affecting the Development and Design of Electrical Control Gear for Machine Tools," by A. R. H. Thorne.

Thursday, 11th May

BATH.—Electricity Showrooms, 7 p.m. I.E.E. Bristol Students' Section. Annual general meeting.

LONDON.—Savoy Place, W.C.2, 5.30 p.m. Institution of Electrical Engineers. Extra meeting. Lecture on "The Analysis of Action Potentials in Electromyography," by P. Bawens.

Friday, 12th May

BIRMINGHAM.—Imperial Hotel, Temple Street, 6.30 p.m. Old Centralians' Association, Midland Branch. Reunion and dinner.

LONDON.—At the Royal Society of Arts, Adelphi, W.C.2, 7.30 p.m. Junior Institution of Engineers. "Hydro-Electric Development," by G. F. Kennedy.

Caxton Hall, S.W.1, 6.30 p.m. E.P.E.A. Southern Meter Engineers' Group. "The Operation and Maintenance of Electrical Protective Gear on Secondary L.V. Transmission Systems," by Dr. F. H. Last.

Saturday, 13th May

LONDON.—I.E.E. London Students' Section, 10 a.m. Visit to G.P.O., Faraday Building, E.C.4.

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

CONTRACTS OPEN

Where "Contracts Open" are advertised in our "Official Notices" section, the date of the issue is given in parentheses.

Australia.—QUEENSLAND.—7th June. State Electricity Commission. Gas-cum-oil engine driven generating plant for the Charleville power house. (C.R.E. (I.B.) 49673/50. Ten/1181.)*

9th June. Brisbane City Council. 33 kV underground and submarine cable, multi-core underground and submarine pilot cable. (C.R.E. (I.B.) 47945/50. Ten/1123.)*

30th June. Queensland Government Railways. Supply of ten diesel electric locomotives. (C.R.E. (I.B.) 50933/50. Ten/1218.)*

28th September. City Electric Light Co., Ltd. Two steam boilers and accessories for the Bulimba "B" power station. (C.R.E. (I.B.) 51002/50. Ten/1226.)*

Breconshire.—County Council. Rewiring and new electrical installation at Tymawr Home Office School, Gilwern, near Abergaveny. (See this issue.)

Cheadle & Gatley.—11th May. U.D.C. Street lighting stores. (See this issue.)

Hastings.—13th May. Town Council. Electrical installations in forty-three houses on the Hollington estate. Borough engineer, 37, Wellington Square.

New Zealand.—WELLINGTON.—27th June. State Hydro-Electric Department. Four 50 kV circuit breakers for Touranga Substation. (C.R.E. (I.B.) 50443/50. Ten/1216.)*

1st August. State Hydro-Electric Department. Two 16,500 kVA transformer banks. (C.R.E. (I.B.) 51227/50. Ten/1230.)*

North Riding.—11th May. Education Committee. Electrical installation at new county primary school at Saltburn-by-the-Sea. F. Barraclough, secretary, Education Offices, County Hall, Northallerton.

Penzance.—29th May. Borough Council. Installation of electric motors, gearing, etc., for operation of opening gear to floating dock gates. D. J. Beattie, town clerk, Municipal Buildings.

Rothwell.—25th May. U.D.C. Electrical wiring for sixty-four houses on the Lawrence Villa site, Woodlesford. Architect, Civic Buildings, Rothwell, near Leeds.

South Africa.—DURBAN.—23rd June. City Council. E.h.v. switchgear for three substations. (C.R.E. (I.B.) 48932/50. Ten/1161.)*

Southend-on-Sea.—23rd May. Corporation. New electrical installation, electrical machines laboratory, London Road Schools. (See this issue.)

Sunderland.—20th May. Town Council. Installation of electricity in 276 houses on the Pennywell site. Borough architect, Grange House, Stockton Road.

Uruguay.—MONTEVIDEO.—22nd June. Administracion General de las Usinas Electricas y los Telefonos del Estado. Indoor and outdoor transformers. (C.R.E. (I.B.) 50260/50. Ten/1212.)*

ORDERS PLACED

Darlington.—Town Council. Electric wiring at Waterworks filter house (£301).—Doves (Darlington), Ltd.

London.—L.C.C. Electrical installations in Venetian Road School, S.E.5 (£463), White City primary school No. 1 (£3,317) and White City primary school No. 2 (£1,529).—D.C. Engineering Co., Ltd.

Longbenton (Northumberland).—U.D.C. Electrical installations in 72 houses at Annitsford, Hazlerigg, and Seaton Burn.—Tompkins & Stubbs, Wallsend.

Wednesbury.—Corporation.—Electrical wiring in 90 houses and 22 bungalows on part of golf course housing estate.—Midlands Electricity Board.

CONTRACTS IN PROSPECT

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Bangor.—Botany and forestry buildings at University College of North Wales; Sir Percy Thomas & Son, architects, 10, Cathedral Road, Cardiff.

Belfast.—Houses (125), Newcastle and Kilkeel, for Northern Ireland Housing Trust; McMillan Jeffers & Co., Ltd., builders, 219, Shore Road.

Blantyre.—Three-bay fire station and administrative buildings, Whistleberry Road, for Lanarkshire Fire Brigade Joint Committee; county architect.

Brackley.—Pithead baths and first aid centre for National Coal Board; J. Gerrard & Sons, Ltd., builders, Swinton, Lancs.

Brownhills.—Houses (64), Bridge Road, Shelfield, and Ogley Road, Brownhills; Jennings, Homer and Lynch, architects, 3 & 5, Church Street, Brierley Hill.

Burnley.—Infants' school, Myrtle Bank, for E.C.; Quiggin & Gee, architects, Harley Buildings, Old Hall Street, Liverpool, 3.

Factory, New Hall Street; John Spencer (Burnley), Ltd., Imperial Mill, Rose Grove.

Burton-on-Trent.—Alterations and improvements at children's home (£10,802); Peter Roscoe (Contractors), Ltd., Newton Street.

*Specifications may be inspected at the Commercial Relations and Exports Department, Board of Trade, Thames House North, Millbank, S.W.1 (Victoria 9040).

Lincoln.—Block of eight shops, five flats and eight maisonettes, Boultham Moor North estate; city architect.

Liverpool.—New X-ray department at Newsham General Hospital; A. Neville Holt, architect, Imperial Buildings, 20, Exchange St.

London.—FOREST GATE.—Nurses' home at Forest Gate Hospital; North East Metropolitan Regional Hospital Board, 3, Queen Anne Street, W.1.

WANDSWORTH.—Block of 12 maisonettes, Chelsham Road; borough architect.

Midlothian.—Houses (94), West Calder; county architect, 32, Palmerston Place, Edinburgh.

Much Wenlock.—Secondary school; J. Bromley & Sons, Church Stretton, Salop.

Newcastle-on-Tyne. — Rebuilding fireplace factory, Back George Street, for G. Langley; Wilson and Wilson, architects, 90, Pilgrim Street.

Northampton.—Houses (54), King's Heath; borough architect, The Guildhall.

Nottingham.—Infants' school between Bilborough Road and Melbury Road; R. M. Finch, surveyor.

Pershore.—Horticultural institute, Avon Bank (£200,000) proposed by Worcestershire E.C.; county architect, County Offices, Worcester.

Plymouth.—Factory, junction of Emma Place and Chapel Street, Stonehouse; Oxo, Ltd., Thames House, Queen Street Place, London, E.C.4.

South Shields.—Secondary boys' technical school; J. Wilks, architect, 29, King Street, South Shields.

Stafford.—Conversion of hutments at Seighford R.A.F. Camp into 60 dwellings; Woodward & Sons, Silkmore Lane.

Stockton-on-Tees.—New works and foundries and extensions to existing works for Ashmore Benson Pease and Co., Ltd., gas plant manufacturers, Stockton.

Stoke-on-Trent.—Houses for T.C.: L. Bates, Ltd., Burslem (30); W. Brammer & Co., Ltd., Hartshill (12); W. Leake & Co., Ltd., Sneyd Green (30); Dickinson (Burslem), Ltd., Burslem (28); W. D. Cooke & Co., Ltd., Sneyd Green (14); Morgan Building Co., Ltd., Stoke-on-Trent (48).

Stone.—Houses (100) at Adamthwaite Drive; W. Hawkes, R.D.C. surveyor.

Stourbridge.—Shops and flats at Norton estate; G. N. Maynard, borough architect.

Thornaby-on-Tees.—Works additions, Mandale Road, for W. and M. Humphrey, Ltd., sugar millers; S. Coates, Ltd., builders, Langbaurgh Place, North Ormesby, Middlesbrough.

Wallasey.—Infants' schools, Mount Road and Poulton Road; borough architect.

Warrington.—Houses for T.C.: D. Cooper, Ltd., Warrington (18), and Osborne & Co. (Warrington), Ltd. (18).

Windermere.—Houses (20), Oldfield estate; J. H. Atkinson, Ayside, Newton-in-Cartmel, Grange-over-Sands, Lancs.

The Building Industry

Working Party's Report

THERE are a number of points of interest to electrical contractors in the report of the Working Party on Building Operations (H.M. Stationery Office, 2s 6d) of which Sir Thomas W. Phillips, C.B.E., was chairman and Mr. H. Drake, B.A., past president of the Electrical Contractors' Association, was a member.

The report shows that in May, 1945, out of a total of 3,733 specialist firms employing operatives concerned in the building industry, there were 2,281 electrical contractors; by May, 1949, the total had risen to 6,954, of whom 5,004 were electrical contractors. It is said that if the electrical contractors who employ no operatives were included the increase would be found to be substantially greater.

The Working Party does not recommend the qualitative registration of builders, but considers that the Ministry of Works registration should be continued for statistical reasons. It is probably desirable on grounds of public health and safety to continue some form of registration in the plumbing and electrical trades.

It is thought that only in exceptional cases of highly specialized work should the architect nominate a sub-contractor or obtain separate tenders for the work. Representatives of sub-contractors urged in their evidence that nominated sub-contractors ought to have more effective protection than they have at present against loss owing to delay or insolvency on the part of the principal contractor. It is recommended that consideration should be given to the possibilities of a form of sub-contract which would give further protection to the sub-contractor without being unduly onerous to the contractor or the building owner.

On the subject of incentive schemes the Working Party says that, although certain specially skilled work is unsuitable for "bonusing," there is no evidence to show that "bonused" work is generally of inadequate quality.

The opinion is expressed that it would be of advantage if power-driven tools could be more widely used on sites, as is the general practice in the United States. But any substantial contribution to the cost of a new cable for the purpose would have to be taken into account by the contractor in deciding whether the use of power tools would actually reduce costs.